R.B

PLECTRON

SERVICE MANUAL
F. M. TRANSISTOR RECEIVER
CHIEF MODEL
R19A4-R19B4-R20A4-R20B4

Electronic Tone Control Specialists

PLECTRON CORPORATION
OVERTON, NEBRASKA

SERVICE MANUAL
F. M. TRANSISTOR RECEIVER
CHIEF MODEL
R19A4-R19B4-R20A4-R20B4

Form #415-5-66

RECEIVER SPECIFICATIONS

Low Band (25-54MHz)	Models R19A4 and R19B4
High Band (148-175MHz)	Models R20A4 and R20B4

Printed Circuit Board	Number of Transistors	Component Group	Description	Part #
Power Supply	6	100	Without Charger	1X3813
	11	100	With Charger	1X3814
RF Amplifier	4	200	Low Band	1X3283
	4	300	High Band	1X3872
IF and Audio	16	600	Without Alert Light	1X3792
	20	600	With Alert Light	1X3793
Tone Amplifier	10	500	Single Tone	1X3696
	12	500	Duotone	1X3697
Tone Filter		400		1X3714

NOTES: 4 tones possible with single tone receivers.
3 Duotone channels possible with Duotone receivers with one tone common.

Power Requirements:	117V 60 cycle AC or 12.6V DC external. Standby 1.3 watts, Activated 13 watts. Internal Batteries 12.6 volts, 300 mw standby maximum.
Dual Conversion:	10.7MHz 1st IF, 455kHz 2nd IF.
Audio Power Output:	Full 1.5 watts with less than 10% distortion.
Speaker:	3" x 5" PM. 3-4 ohm voice coil-external outlet for remote speaker.
Selectivity:	6db max. at ±7kHz, 60db max. at 30kHz.
Sensitivity:	Low Band-20db quieting at 0.5μv. High Band-20db quieting at 1.0μv.
Tone Sensitivity:	Low Band-Activate less than 0.2μv. High Band-Activate less than 0.5μv.
Tone Frequency	Bandwidth is 4% (±2%) of frequency on assigned frequencies between 643 and 2465 Hz for single tone receivers and 643 to 3000 Hz for Duotone receivers.

Tone Activation: (time limits)	Single tone-minimum 3 seconds. Duotone-2 tones required, first (A) tone minimum 600 millisecond followed by second (B) tone minimum of 250 millisecond with no greater time between tones than 10 millisecond.
Cabinet:	Vinyl plastic permanently laminated to 0.032 aluminum with chrome trim.
Dimensions:	10½" long (+1 for handle), 3 3/8" high (+3/8" for mobile mounting bracket), 7" deep. Mobile bracket is 12" long.
Weight:	6 pounds plus batteries (1 lb. 2 oz.)

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1. GENERAL DESCRIPTION:

The Plectron Transistorized Radio Alerting system is the most modern and effective means of communication with selected groups of people. The system is flexible, permitting alerting special sub-groups or individuals without calling the entire group. It is not affected by weather conditions, closed windows, etc., which render sirens or horns ineffective. The voice feature also makes it possible to give directions and special instructions quickly and effectively.

The Plectron Chief is designed for personnel who desire to monitor the channel part of the time. The options available for the Chief model makes it a versatile aid that may be used in the home or office on 117 VAC, mobile on the 12 volt DC vehicle power, or portable with the optional rechargeable battery pack.

2. OPERATING INSTRUCTIONS:

The following instructions will help the user obtain the most satisfaction from the use of his Plectron Chief Receiver.

2.1 LOCATION OF THE RECEIVER:

Place the receiver where it can be heard and understood easily. In buildings of reinforced concrete construction or where steel framing, wire lath or aluminum siding has been used, best results will be obtained if the receiver is placed near a window.

2.2 ANTENNAS:

IMPORTANT: Do not attempt to use the receiver without an antenna. Low band receivers are supplied with six feet of flexible wire with a plug to fit the external antenna socket on the back of the receiver and high band receivers are supplied with a 20 inch steel whip if the receiver is not purchased with the optional telescoping antenna. These antennas should be placed in a vertical position.

CAUTION: THE OPTIONAL TELESCOPING ANTENNA MUST BE FULLY EXTENDED FROM THE CASE BEFORE BEING ROTATED TO THE VERTICAL POSITION.

Either the supplied antenna or the telescoping antenna will give excellent results in most locations. If more range is necessary, an outdoor antenna specifically designed to work with this equipment should be used. See accessory brochure next to last page.

2.3 CONTROLS:

117 VAC & PORTABLE-MOBILE Switch: located on the back of the receiver must be switched to "117 VAC & PORTABLE" for operation on AC or Portable. Should the 117 VAC fail, receivers equipped with batteries will automatically switch to the internal supply. To operate the receiver from an external 12 VDC supply, the switch must be in the "MOBILE" position.

If the receiver is equipped with batteries it will also contain an automatic charging circuit to prevent excessive usage of the batteries. This circuit will cut the receiver OFF when operating in the PORTABLE position if the batteries have run too long without charging. To recharge the batteries simply operate the receiver with an 117 VAC input. Under normal conditions recharging of the batteries will take 6 to 8 hours, however, it may take as many as 16 hours to recharge a battery that has been completely discharged.

CAUTION: Always make sure the 117 VAC & PORTABLE-MOBILE Switch is in the 117 VAC & PORTABLE position when operating on AC, otherwise the batteries are disconnected and will not be charged to maintain their ready condition which will result in lack of standby power in an emergency. THIS SWITCH MUST ALSO BE IN THE 117 VAC & PORTABLE POSITION BEFORE SET IS TURNED ON.

NOTE: The pilot lamp will NOT operate from the internal battery pack.

2.3.1 VOLUME CONTROL:

This is a combination ON-OFF switch and volume control. The extreme counterclockwise position is OFF. Advancing the control clockwise turns the receiver ON, illuminates the Pilot Lamp (in 117 VAC and MOBILE use) and increases the volume.

2.3.2 SQUELCH CONTROL:

To adjust the receiver in a quiet but very sensitive condition, the Squelch control should be turned clockwise until the receiver just quiets. In the event that activation from weak signals or skips become objectionable, the control may be turned farther clockwise and then only stronger signals will be received. Signals the user may wish to receive may fade in and out under certain atmospheric conditions; it is suggested that the Squelch control be turned counterclockwise and monitoring be done temporarily with between-transmission-noise present to obtain these messages.

2.3.3 ALERT-RESET Switch ALERT LIGHT: (optional) When a receiver so equipped has been tone activated the pilot lamp will begin to blink (flash on and off) and will continue to do so until reset by the ALERT-RESET switch. This switch will reset the receiver if it has not automatically reset and the blinking of the pilot lamp will stop when the switch is released to the ALERT position. Testing the ALERT LIGHT circuit may be accomplished by pushing switch to the RESET position.

2.3.4 MONITOR-ALERT Switch: Enables the operator to monitor the base station and still have all the features of tone activated alerting. With this switch in the MONITOR position the receiver will respond to all transmissions (within range) on its operating frequency. In ALERT position the receiver will be silent until the proper activating tone is received. When activated, the receiver will become LIVE and the user will hear the tone, followed by the voice message from the dispatcher.

If the Squelch control has been set to the point where the receiver just quiets in the monitor position, the receiver will quiet after the transmission and automatically reset in approximately 20 seconds. Should another transmission be received during the 20 second period, the receiver will continue to operate until there has been a 20 second delay between transmissions.

If the Squelch control has been set to the point where all between-transmission-noise is present, the receiver will not reset unless the receiver is turned OFF and back ON, or until the Squelch control is advanced to quieting and there is approximately a 20 second delay between transmissions. Reset may also be accomplished by pressing the ALERT-RESET switch.

Receivers Models R19C and D, R20C and D will be equipped with an automatic fixed timed reset. These receivers will reset in approximately 2 minutes (or shorter time if requested) regardless of transmissions. The Squelch control may be adjusted to quiet between transmission or opened for between-transmission-noise without affecting reset time.

2.3.5 ON-OFF DUTY Switch:

Optional on receivers with two or more tones installed. It enables the user to eliminate unwanted alarms when off duty. In the OFF position, the receiver will activate from all transmitted tones except the one which is controlled by the DUTY switch. In the ON position, all alarms will be received.

2.4 REMOTE SPEAKER:

A phono jack socket labeled REMOTE SPKR. is provided on the back of the receiver for connecting an external speaker; usable at any distance up to 300 feet from the receiver. A four inch speaker in a metal case, part #1X800, with cable and plug, part #1W3548, (or as a complete assembly, part #1X3549) is available from Plectron Corporation. Specify length of cable when ordering.

2.5 DC POWER CABLE (Optional):

Two are available. One cable, part #1W3070, has a cigarette lighter adapter plug on the end for plugging into the cigarette lighter. CAUTION: The socket may have to be cleaned in order for the plug to make proper contact. The other cable, part #1W3014, is for permanently connecting to the 12 volt supply of the vehicle. This cable has two conductors, the positive (+) conductor is indicated by a small raised rib on the insulation. It is IMPORTANT THAT THE CORRECT POLARITY BE OBSERVED WHEN CONNECTING THIS CABLE.

If the Squelch control has been set to the point where no background noise is present, the receiver will not reset unless the receiver is turned OFF and back ON, or until the Squelch control is advanced to [illegible] and there is approximately a 10 second delay between transmissions. Reset may also be accomplished by pressing the ALERT RESET switch.

Receivers [illegible] will be equipped with [illegible] timer. These receivers will reset in approximately [illegible] shorter time [illegible] regardless of [illegible]. The Squelch control may be [illegible] between [illegible] noise without affecting reset time.

2.3.3 [illegible] ONLY Switch

Optional on receivers with two or more alerts installed. [illegible] In the OFF position, the receiver will activate on all [illegible] tones except the one which corresponds to the ONLY switch. In the ON position, all alerts will be received.

2.4 [illegible] SPEAKERS

A [illegible] jack [illegible] is provided on the back of the receiver for connecting an external speaker [illegible] from the receiver. A [illegible] speaker in a metal case, part [illegible] as a complete assembly [illegible].

2.5 [illegible] (Optional)

[illegible]

3. CIRCUIT DESCRIPTION:

The following descriptions are included to aid the serviceman in following the signal from the antenna through the various stages in the Plectron transistor receiver to the audio output. Careful study of this section will prove helpful in servicing this equipment.

3.1 POWER SUPPLY:

The power supply is designed for use on 103-130 volts 60 cycles AC, 11-17 volts DC mobile power source, or the optional 12.6 volts DC internal rechargeable battery.

3.1.1 117 VOLTS AC OPERATION:

The power supply uses a full wave bridge rectifier with transformer isolation from the line. The bridge output is filtered by C101 and applied to the first regulated circuit (13.2V) which supplies the audio and optional alert light section and the low positive regulated supply (10V). Terminals 106, 107 and 108 are at 13.2V, terminals 110, 111 and 112 at 10V.

Regulated 13.2V is adjusted by R111 and controlled by Q101, 102 and 103. An increase in current demand by the receiver's audio section will decrease the bias and decrease collector current of Q103. This increases forward bias and collector current of Q102, which results in increased collector current of the series regulator, Q101, to compensate for the original change.

Regulated 10 volts is automatically adjusted by the values of CR105 and CR107 (5% tol.) and controlled by Q109, 110 and 111. Regulation is accomplished in the same manner as described above.

3.1.2 PORTABLE OPERATION:

Optional rechargeable batteries and the associated charging circuit permits portable operation. The charging circuit is mounted on the power supply printed circuit board and consists of Q104 through Q108 with associated components.

When operating from internal batteries, the path for current flow is from the battery through Q108 to the regulated low voltage supply through F102 back to the battery. This circuitry prevents excessive discharging of the battery. As the receiver continues to operate from internal batteries, the DC potential will decrease. When this potential has decreased to the point of cut-off of the Zener diode, CR105, the circuit is opened preventing further discharging of the batteries.

> NOTE: In power supplies with charging circuit, R111 is adjusted for 15.6V output and R113 for 13.2V (See adjustment section page 5.1 for complete details).

With the batteries partially or completely discharged and the receiver operated with an input of 117 VAC, the regulated high voltage will exceed the battery potential, causing current flow through the parallel network (R116 and CR103, 104 and

R122). This forward biases Q107 into conduction decreasing collector current in Q103 and increasing the regulated high positive voltage to 15.6V. This causes the batteries to charge at approximately a 200ma rate. As the batteries become charged the current and resulting voltage drop across the network decreases. When the drop is less than 0.6 volts (batteries charged to 15V) Q107 cuts off, stopping the charging cycle.

Additional protective circuits are incorporated as follows:

1. Q104 with R105 and R107 prevents a short charge cycle due to low line voltage. At line inputs below 100V forward bias applied to Q104 maintains the bias on Q107 to complete the charging cycle.
2. Q105 and associated components prevent residual drain on the batteries after CR105 ceases conduction.
3. Q106, C103, R108, and R115 is an automatic charging activator. Each time the receiver is turned on with an AC input, this circuit starts the charging cycle to insure a fully charged battery.

NOTE: Pilot lamp will NOT operate from the internal battery pack.

3.1.3 MOBILE OPERATION:

While operating in mobile condition the high positive voltage is fed directly from the vehicle power, and the low voltage is regulated as explained in 117 VAC operation.

3.2 RF AMPLIFIER - HIGH BAND:

The incoming RF signal is coupled through T301 to the emitter of the first common base RF Amplifier, Q301. Amplified RF appears across L301 and is applied to the tuned circuit composed of C306 and L302. This energy is than applied to the emitter of Q302 and developed across L303 then applied to the base of Q304 through T302.

The first local oscillator uses a quartz crystal, Y301, operating in the third overtone mode with Q303 providing the amplification. Oscillator output is coupled from L304 to the harmonic generator, tuned to the fourth harmonic, then applied to the base of Q304.

The 10.7MHz signal from Q304 passes through R314 to T303. R314, in series with the collector of Q304, assures stable operation of the mixer at high signal levels. T303 provides the impedance match between Q304 and the 50 ohm coaxial cable, which provides a signal path to the 10.7MHz circuit on the IF Audio board.

The following equation is used for calculating the crystal frequency on high band.

$$\text{Crystal Frequency (MHz)} = \frac{\text{Station Frequency (MHz)} \pm 10.7}{4} \quad \text{(Note 1)}$$

3.3 RF AMPLIFIER - LOW BAND:

The operation of this circuit is very similar to the high band RF Amplifier and is felt no further explanation is needed.

$$\text{Crystal Frequency (MHz)} = \text{Station Frequency (MHz)} \pm 10.7 \quad \text{(Note 1)}$$

Note 1: While normally run below the RF signal frequency certain interference conditions may make high side use desireable.

3.4 IF-AUDIO CIRCUIT:

The 10.7MHz signal from the RF Amplifier is coupled to the base of Q601 by T601. Signal from the collector of Q601 is applied through T602 to the second mixer, Q603.

The second oscillator in this dual conversion receiver consists of Q602 and associated components which operate at 11.155MHz with a fundamental mode crystal or may operate at 10.2450MHz in order to control certain interference conditions. Oscillator output is applied to the emitter of Q603.

The 455kHz output from Q603 is fed to the IF amplifier stages. These stages are designed to give optimum gain with the desired bandwidth for 5kHz modulation and sharp rejection of adjacent channel signals. Q606 and 607 are R-C coupled IF amplifier-limiters, emitter follower driving the final IF amplifier, Q608. Signal from Q608 is applied to both the primary and secondary (quadrature voltage) of the discriminator, T607, then on to the detector circuit. R634 and C620 comprise the audio de-emphasis network.

The audio signal from the detector circuit is applied to the base of Q609 which supplies signal to two separate circuits in the receiver: (1) Audio at the collector is applied through the volume control (R701) and C623 to the audio driver Q610. R624 completes the DC path for Q609 collector current and provides a minimum volume setting. (2) Audio from the emitter follower section of Q609 is covered in the sections on Squelch and Tone circuits.

This receiver is so designed that the audio driver and output stages are biased to cut-off when the receiver is in standby condition. R638, 639 and 640 form a bias network for Q610. When the junction point of R638 and 639 is isolated from the negative side of the power supply by a non-conducting transistor (Q620) the audio driver will function as a class "A" amplifier.

The conduction of Q610 will cause a voltage drop across R642 and bias the output transistors (Q611 and 612) for class "B" operation. When Q620 is saturated, the junction point of R638 and 639 is returned to the negative side of the power supply, forward bias is removed from Q610 and no drop across R642 results in Q611 and 612 being held at cut-off.

3.5 SQUELCH CIRCUIT:

This circuit is composed of four transistors (Q617, 618, 619 and 620) and associated components using noise signals above normal modulation to quiet the speaker and hold the receiver in standby condition. The desired amount of audio signal (voice modulation, tone and atmospheric noise) coupled from emitter of Q609 is applied to Q617. Output of the emitter follower feeds a high pass filter, passing only the higher noise frequencies, to the noise amplifier, Q618. CR604 and 605 rectifies this noise and produces a DC voltage to forward bias Q619, saturating Q620 which cuts Q610 off. When the noise decreases to a level sufficient to bias Q619 and 620 off, Q610 will conduct and the audio circuit opened. Noise level may be decreased by rotating the Squelch control (R702) counterclockwise or by the reception of an RF signal. CR603 connected to the high pass filter has the effect of decreasing sensitivity of the Squelch circuit when Q610 is conducting, this reduces interruptions when receiving weaker signals.

3.6 TONE CIRCUIT:

The purpose of the tone circuit (tone amplifier and tone filter) is to activate the receiver and the optional alert memory light when the proper tone or tone sequence is fed to the tone filter. A choice of two different tone activation circuits is available and are classified as single tone and Duotone.

3.6.1 SINGLE TONE:

Audio signal, including tone, from the emitter of Q609 is applied to the base of Q501. Q501 and 502 are class "A" DC coupled amplifiers with feedback stabilization. These amplifiers are saturated under normal modulation conditions producing a square wave output that is applied to the noise diode (CR503) and tone filter.

3.6.2 TONE FILTER:

This circuit is a high Q resonant tank which consists of the frequency determining network (CT403, 404 and 405 with L401) and bandwidth controlling capacitors (CS401 and 402).

The resonant rise of the tuned circuit is rectified by CR401 to produce a DC output which is coupled from terminal 400A for single tone or first tone of Duotone and 400B for second tone of Duotone.

3.6.1 cont. SINGLE TONE:

Noise output from the tone amplifier is rectified by CR503 to produce a negative voltage that is applied to Q503 holding it beyond cut-off until the input from the tone filter (when proper tone is received) overrides this potential causing Q503 to conduct charging C503. This lowers the potential at TP4 to cut off Q504 allowing Q506 to conduct and forward biasing Q507 into conduction to charge C504 which applies forward bias on Q509 and 510. Q510 saturates, removing the bias from Q508 and 511. With Q511 cut-off, forward bias is applied to Q610 (audio driver) permitting it to conduct. The Squelch circuit must be activated (See page 3.4 Squelch circuit) at the same time to permit audio output.

The automatic reset circuit consists of CR502, C504, R518 and R522. When CR502 and R518 are installed Q506 is held on until the transmission is completed and the receiver will reset 20 seconds later. If these two components are omitted, Q506 will cut-off at the completion of the tone signal allowing C504 to start discharging. The receiver will reset in approximately 20 seconds (or longer) by changing the value of R522, if requested).

3.6.3 DUOTONE:

The operation of this circuit is the same as a single tone through Q504. When Q504 is cut-off by the A tone, Q506 is held off by Q505. Conduction of Q506 can be accomplished by applying the B tone, which will develop a voltage to forward bias Q512 and cut-off Q505. Q504 is held cut-off by the charge on C503 for 100 milliseconds after A tone ends, so the B tone must be applied within this period of time to have both Q504 and 505 cut-off at the same time to allow conduction of Q506. When Q506 conducts the remainder of the circuit operates as explained in single tone.

CR505 clamps the base of Q512 at a negative 0.6V to allow faster activation of the B tone.

3.7 ALERT MEMORY LIGHT (Optional):

This circuitry consists of four transistors and associated components. Its purpose is to interrupt the steady glow of the pilot lamp causing it to flash when an alert has been received. This light will continue to flash until reset by pressing and releasing S702 or until receiver has been turned off.

Before the proper activating signal is received, and with S701 in the ALERT position, the transistors are operating in the following conditions: Q613 and 615 off while Q614 and 616 are conducting.

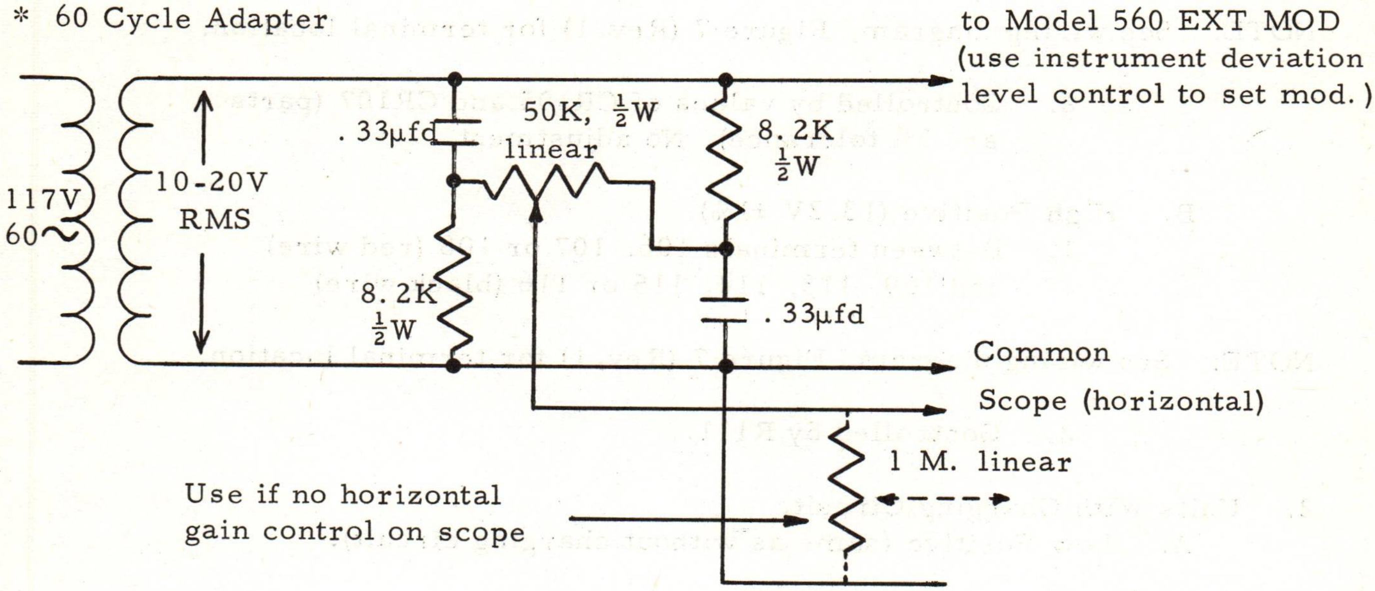
When the proper tone is received the tone amp and squelch activates causing a voltage rise (coupled through R644) to be applied to the base of Q613 driving it into conduction. When Q613 conducts Q614 is turned off. (Q613 and 614 is a Schmitt trigger). As Q614 cuts off, a rise in voltage is applied to the base of Q615 forcing it to conduct, starting the free running multivibrator (Q615 and 616). This causes the pilot lamp to flash.

The alert light circuit may be checked by pressing the Alert-Reset switch (S701) when S702 is in alert position. Releasing the Alert-Reset switch will return to normal operation and the pilot lamp will glow continuously.

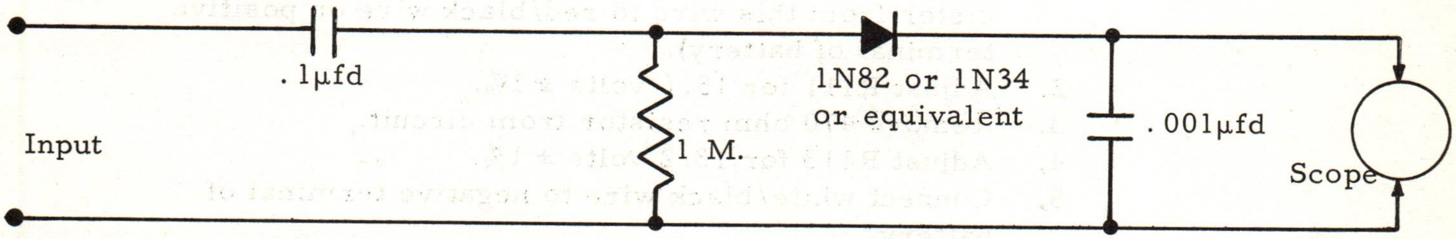
4. RECOMMENDED TEST EQUIPMENT AND SPECIAL TOOLS:

1. Frequency meter capable of FCC standards.
2. RF Sweep Generator (measurements, model 560FM signal generator or equivalent swept by *60 cycle adapter).
3. Audio oscillator, Plectron model 95 or equivalent.
4. VTVM.
5. Oscilloscope with **RF probe.
6. RF Voltmeter or ***RF probe for VTVM.
7. Alignment tools:
    - A. Non-magnetic: Hex-RF board-.100 inch across flats, GC8806L.
    - B. Non-magnetic: Hex-IF board-..075 inch across flats, GC9296.

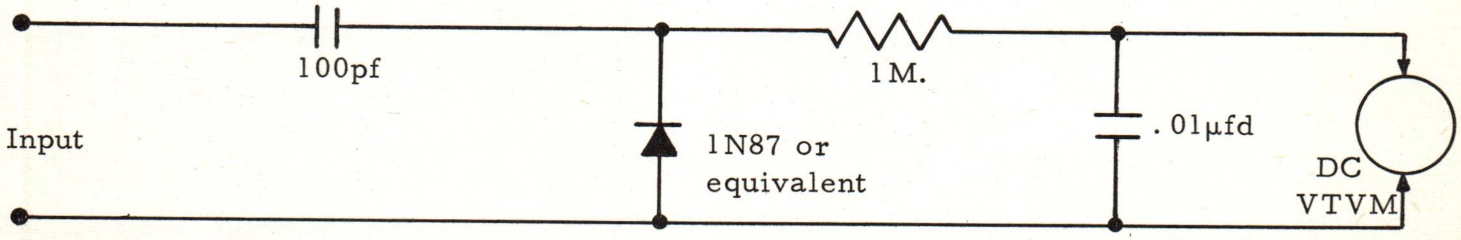
* 60 Cycle Adapter



** Suggested RF Probe for Oscilloscope (DC coupled scope required. Response to 100kHz adequate.)



***Suggested RF Probe for VTVM



5. ADJUSTMENTS:

5.1 POWER SUPPLY:

Adjustment of the power supply should not be necessary as they are adjusted at the factory and controls sealed to prevent accidental movement. If it is necessary to readjust, the following procedure must be followed:

1. Units Without Charging Circuit.
    - A. Low Positive (10V)
        - 1. Between terminals 110, 111 or 112 (red/yellow wire) and 109, 113, 114, 115 or 116 (black wire).

NOTE: See wiring diagram, Figure 7 (Rev. 1) for terminal location.

        - 2. Controlled by values of CR105 and CR107 (parts are 5% tolerance). No adjustment.

    - B. High Positive (13.2V ±1%).
        - 1. Between terminals 106, 107 or 108 (red wire) and 109, 113, 114, 115 or 116 (black wire)

NOTE: See wiring diagram, Figure 7 (Rev. 1) for terminal location.

        - 2. Controlled by R111.

2. Units With Charging Circuit.
    - A. Low Positive (same as without charging circuit).

    - B. High Positive.
        - 1. Disconnect batteries (remove white/black wire from negative terminal of battery and connect 470 ohm resistor from this wire to red/black wire on positive terminal of battery).
        - 2. Adjust R111 for 15.6 volts ± 1%.
        - 3. Remove 470 ohm resistor from circuit.
        - 4. Adjust R113 for 13.2 volts ± 1%.
        - 5. Connect white/black wire to negative terminal of battery.

6. Alignment Figures

6.1 All Figures were made by using the Tektronix oscilliscope type 561A and Camera C-12 with 20KHz deviation and 60 cycle modulation.

Figure A

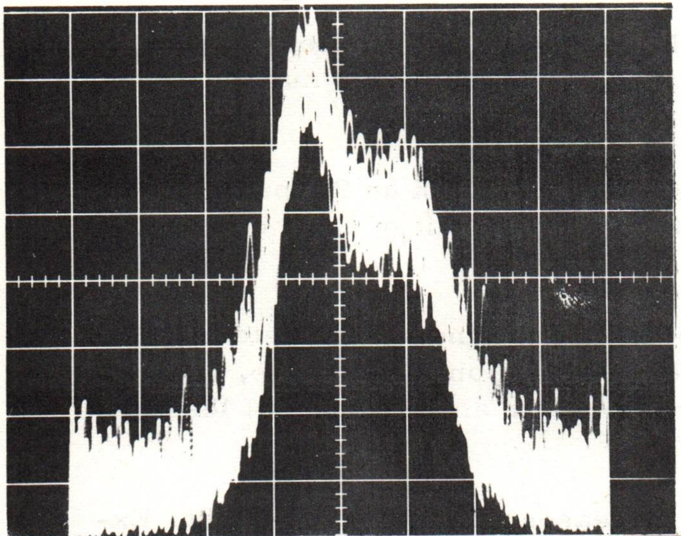
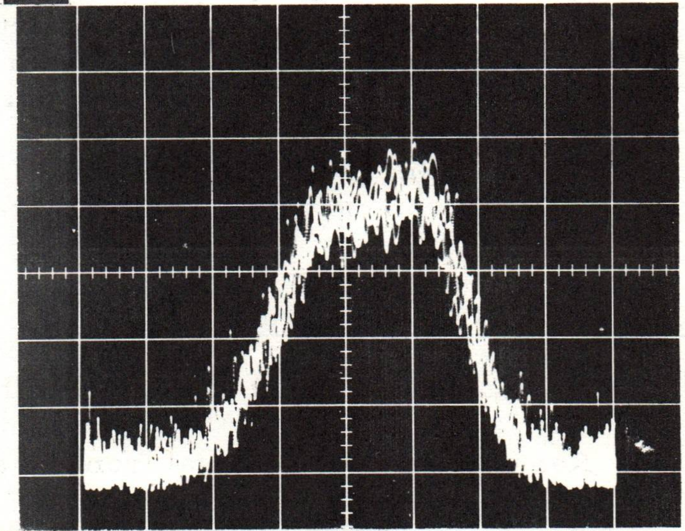


Figure B



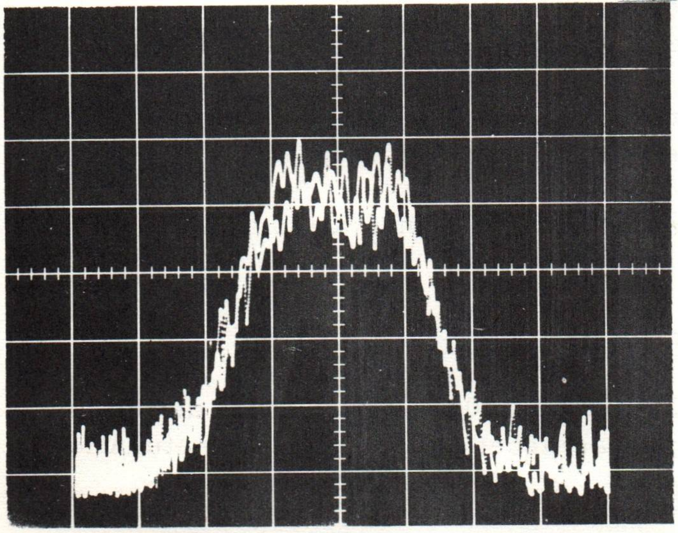


Figure C

6.2 RECEIVER ALIGNMENT:

Plectron receivers are accurately swept aligned at the factory with highly stable generators and precision frequency standards. If realignment is necessary, the following procedure should be followed to keep the proper bandpass.

6.3 RF AMPLIFIER (High Band):

1. Connect a DC VTVM across R311 (1.2KΩ) in the emitter of Q303. Adjust the tuning core in the oscillator coil, L304 for maximum deflection of the voltmeter, (approximately 2.1 volts).

2. Connect an RF voltmeter or a DC voltmeter with an RF probe (see section four) across R627, in the emitter circuit of Q607 on the IF-AUDIO BOARD.

3. Connect a signal generator calibrated to the incoming RF to the antenna input jack. With the voltmeter setting on a low range, increase the signal generator output from 0 to attain an indication of less than 1 volt.

CAUTION: Make sure the voltmeter output increases with generator input. Excessive input will cause limiting action to start with the result that voltmeter output will decrease with generator input. Generator input should be less than 1 microvolt.

4. Adjust tuning core in T301, T302, L302, T303 and L305 for maximum deflection on meter. Readjust generator input as necessary to prevent saturation.

6.4 RF AMPLIFIER (Low Band):

1. Connect a DC VTVM across R213 (1.2K) in the emitter of Q203.

2. Remove the quartz crystal from its socket and note voltage reading, (approximately 1.6 volts).

3. Turn core out (counterclockwise) of L201.

4. Reinsert crystal and adjust tuning core in the coil until a voltage rise of 0.5 to 0.8 of a volt above reading noted in step 2.

CAUTION: Do not adjust oscillator coil for maximum DC indication as this will cause excessive crystal drive.

5. Perform steps 2 and 3 in paragraph 6.3.

6. Adjust tuning cores in T201, 202, 203 and 204 for maximum deflection on meter. Readjust generator input as necessary to prevent saturation.

6.5 IF-AUDIO:

NOTE: If the receiver has been previously aligned, perform step 2 and then proceed to step 5.

1. Adjustment of the 11.155MHz oscillator coil should not be necessary, however, if needed, place an RF millivoltmeter between terminals 1 and 2 of T603, (negative to terminal 1). Adjust the tuning core from bottom up for a reading of 0.03 volts rms. If no RF millivoltmeter is available, adjust core up 4 complete turns from the bottom. (Open end of coil is top).

2. Perform steps 2 and 3 in paragraph 6.3.

3. Adjust cores in T601 and T602 for maximum deflection on meter. (Adjust for peak nearest the top of transformer).

NOTE: Top of all transformers is open end.

4. Adjust T604, 605 and 606, both top and bottom cores for maximum deflection on meter.

5. Turn bottom cores of T604, 605 and 606 approximately 1½ turns clockwise.

6. Adjust top cores of T604, 605 and 606 for maximum deflection.

7. Shunt R620 with a 22 ohm fixed resistor and adjust bottom core of T604 and 605 (respectively) for maximum deflection.

8. Remove shunt from R620 and shunt R616, adjust bottom core of T606 for maximum deflection.

9. Disconnect meter and connect RF sweep generator (see section 4) calibrated to the RF signal to the antenna input jack.
    A. 20kHz deviation, 60 cycle modulation.

10. Connect oscilloscope with RF probe input (see section 4) between emitter of Q607 and B-. Display on scope should resemble Figure "A".

NOTE: Oscilloscope gain should be approximately 0.2V P-P per division and generator output kept as low as possible for useable display.

11. Adjust bottom cores (slightly) of T605 and 606 to resemble Figure "B".

12. Recheck calibration of RF generator.

13. Adjust top core of T606 to resemble Figure "C".

NOTE: If necessary, repeat required steps to obtain a flat-topped well centered response.

14. Disconnect scope.

15. Connect DC VTVM probe to junction of R632 and 633 with voltmeter common connected to positive side of C618.

16. Modulate RF generator with audio tone (1kHz) with 8kHz deviation and increase output of generator until VTVM reading remains constant. (approximately 10μv.)

17. Adjust bottom core of T607 (discriminator) for maximum reading (approximately 5.5v).

18. Connect probe to junction of R634 and C620, set VTVM on low scale (check zero adjust) and adjust top core for a meter reading of zero volts.

6.6 TONE CIRCUIT:

The bandwidth and resonant frequency are controlled by the following parts:

1. CS401 and 402 controls bandwidth (capacitance increases, bandwidth increases).

2. CT403, 404 and 405 with L401 controls resonant frequency (CT403 is a variable capacitor, closing its plates or increasing the capacitance will lower resonant frequency).

6.6.1 SINGLE TONE:

Tone Filter bandwidth and calibration.

1. Apply externally tone modulated RF signal to antenna jack with 5kHz modulation and 10μv input.

2. Approach tone frequency SLOWLY, from a minimum of 5% above assigned freqyency.

3. Note frequency at turn-on (should be approximately 2% above assigned frequency).

4. Repeat step 2 and 3 approaching assigned frequency from low side.

5. Adjust C403 to center assigned tone frequency.

ALTERNATE METHOD (No RF input required)

1. Disconnect lead at terminal 502 (on tone amplifier).

2. Apply 1 volt peak to peak tone to terminal 502.

3. Perform steps 2, 3, 4, and 5 in previous method.

6.6.2 DUOTONE:

1. Connect jumper from TP5 to negative. This shorts out Q505 and allows the circuit to operate single tone on the first tone.

2. Check circuit as explained for single tone.

3. Remove jumper from TP5 and connect from TP4 to negative. This shorts out Q504 and allows the circuit to operate as single tone on the second tone.

4. Perform step 2.

5. Remove jumper. To properly check the activation two audio oscillators should be used through a proper switching device. The first tone should be applied for approximately 600 milliseconds. Switch to the second tone immediately (with no greater than 10 milliseconds time lapse between tones) and the receiver should activate.

7. PARTS LIST

7.1 POWER SUPPLY PRINTED CIRCUIT BOARD ASSEMBLY

CAPACITORS

ITEM	CIRCUIT SYMBOL	QTY	DESCRIPTION	PART #
1	C101	1	500mfd, 25V, Electrolytic	1C2921
2	C102	1	6.8mfd, minimum WVDC 10	1C3763
3	C103	1	6.8mfd, minimum WVDC 35	1C3763
4	C104	1	100mfd, 25V, Electrolytic	1C3514
5	C105	1	6.8mfd, minimum WVDC 15	1C3763
6	C106	1	4mfd, 50V, Electrolytic	1C1861

RESISTORS

ITEM	CIRCUIT SYMBOL	QTY	DESCRIPTION	PART #
7	R101	1	100ohm, 10%, 2W	1R1916.1000
8	R102, 109	2	1K, 10%, $\frac{1}{4}$W	1R3189.1001
9	R103	1	5.6K, 10%, $\frac{1}{4}$W	1R3189.5601
10	R104	1	180 ohm, 5%, $\frac{1}{2}$W	1R3761.1800
11	R105	1	3.3K, 5%, $\frac{1}{2}$W	1R3761.3301
12	R106	1	12K, 5%, $\frac{1}{2}$W	1R3761.1202
13	R107, 115	2	3.9K, 10%, $\frac{1}{4}$W	1R3189.3901
14	R108	1	1M, 10%, $\frac{1}{2}$W	1R1782.1004
15	R110	1	10K, 5%, $\frac{1}{2}$W	1R3761.1002
16	R111, 113	2	5K, Potentiometer	1R3774
17	R112	1	6.8K, 5%, $\frac{1}{2}$W	1R3761.6801
18	R114	1	2.2K, 5%, $\frac{1}{2}$W	1R3761.2201
19	R116	1	39 ohm, 10%, $\frac{1}{4}$W	1R3189.39R0
20	R117	1	390 ohm, 10%, $\frac{1}{2}$W	1R1782.3900
21	R118	1	4.7K, 10%, $\frac{1}{4}$W	1R3189.4701
22	R119	1	2.2K, 10%, $\frac{1}{4}$W	1R3189.2201
23	R120	1	390 ohm, 10%, $\frac{1}{4}$W	1R3189.3900
24	R121	1	10K, 10%, $\frac{1}{2}$W	1R1782.1002
25	R122	1	5.6 ohm, 10%, $\frac{1}{2}$W	1R1782.5R60
26	R123 (W/O Bat.)	1	10K, 5%, $\frac{1}{2}$W	1R3761.1002

TRANSISTORS

ITEM	CIRCUIT SYMBOL	QTY	DESCRIPTION	PART #
27	Q101	1	PNP, Silicon, SJ652	1V3760
	mtg. hdwr.	1	Heat Sink	1X3781
		2	Screw, #4-40	1H96
		2	Washer, Lock	1H995
		2	Nut, #4-40	1H76
28	Q102	1	NPN, Silicon, 2N3414	1V3672
29	Q103	1	NPN, Silicon *2N2926 green	1V3100
30	Q104, 109	2	PNP, Silicon, *2N3638	1V3758
31	Q105, 106, 107, 110, 111	5	NPN, Silicon, *2N2926 brown	1V3096

7.1 PARTS LIST (POWER SUPPLY, cont.)

ITEM	CIRCUIT SYMBOL	QTY	DESCRIPTION	PART #
32	Q108	1	PNP, Germanium, 2N2431	1V3384

DIODES

ITEM	CIRCUIT SYMBOL	QTY	DESCRIPTION	PART #
33	CR101	1	Rectifier, Selenium Bridge	1V2915
34	CR102	1	Zener, 6.8 volt, 5%	1V3759-6.8
35	CR103, 104, 106 107	4	Silicon, A13FX1 or A13FX2000 or A13FX2004	1V3673
36	CR105	1	Zener, 9.1 volt, 5%	1V3759-9.1

MISCELLANEOUS

ITEM	CIRCUIT SYMBOL	QTY	DESCRIPTION	PART #
37	F101	1	Fuse, 1 amp	1X2478
38	F102	1	Fuse, ½ amp	1X994
	mtg. hdwr.	4	Clip, Fuse	1P3198
		4	Rivet	1H1003
39		1	Power Supply P. C. Board	1X3811
40		1	Power Supply P. C. Board Ass'y. (without charging circuit)	1X3813
41		1	Power Supply P. C. Board Ass'y. (with charging circuit)	1X3814
	mtg. hdwr.	4	Screw, #4-40	1H95
		4	Washer, Lock	1H995

7.2 LOW BAND RF AMPLIFIER PRINTED CIRCUIT BOARD ASSEMBLY

CAPACITORS

ITEM	CIRCUIT SYMBOL	QTY	DESCRIPTION	PART #
1	C202, 211	2	4.7pfd, 5%, 500V	1C3177
2	C203, 204, 206, 207, 208, 210, 212	7	.0015mfd, 20%, 400V	1C1114
3	C214	1	20pfd, 20%, 500V	1C999
4	C216	1	.01mfd, GMV, 600V	1C230

RESISTORS

ITEM	CIRCUIT SYMBOL	QTY	DESCRIPTION	PART #
5	R201, 205	2	1K, 10%, ½W	1R1782.1001
6	R202, 211	2	15K, 10%, ½W	1R1782.1502
7	R203, 206, 207, 209, 212	5	4.7K, 10%, ½W	1R1782.4701
8	R204	1	18K, 10%, ½W	1R1782.1802
9	R208	1	56K, 10%, ½W	1R1782.5602
10	R210	1	2.7K, 10%, ½W	1R1782.2701
11	R213	1	1.2K, 10%, ½W	1R1782.1201

7.2 PARTS LIST (RF AMPLIFIER, cont.)

TRANSISTORS

ITEM	CIRCUIT SYMBOL	QTY	DESCRIPTION	PART #
12	Q201, 202, 203, 204	4	NPN, Silicon, *16L43	1V3109

TRANSFORMERS & COILS

ITEM	CIRCUIT SYMBOL	QTY	DESCRIPTION	PART #
13	T201			
	(25-29MHz)	1	Antenna transformer	1L3404
	(29-32.6MHz)	1	Antenna transformer	1L3405
	(32.6-35MHz)	1	Antenna transformer	1L3406
	(35-41MHz)	1	Antenna transformer	1L3826
	(41-55MHz)	1	Antenna transformer	1L3408
14	T202, 203			
	(25-29MHz)	2	RF transformer	1L3410
	(29-32.6MHz)	2	RF transformer	1L3411
	(32.6-35MHz)	2	RF transformer	1L3412
	(35-41MHz)	2	RF transformer	1L3827
	(41-55MHz)	2	RF transformer	1L3414
15	T204	1	10.7MHz IF transformer	1L3217
16	L201			
	(25-32.6MHz)	1	Oscillator Coil	1L3420
	(32.6-39MHz)	1	Oscillator Coil	1L3419
	(39-55MHz)	1	Oscillator Coil	1L3420

MISCELLANEOUS

ITEM	CIRCUIT SYMBOL	QTY	DESCRIPTION	PART #
17	Y1	1	RF Crystal (Specify RF)	1X3193
18		1	Crystal socket	1P3129
19		3	RF Can Assembly	1X3135
20		1	Low Band RF PC Board	1X3282
21		1	Low Band RF PC Board	1X3283
	mtg. hdwr.	3	Screw, #4-40, black	1H3180

7.3 HIGH BAND RF AMPLIFIER PRINTED CIRCUIT BOARD ASSEMBLY

CAPACITORS

ITEM	CIRCUIT SYMBOL	QTY	DESCRIPTION	PART #
1	C302, 307	2	2.2pfd, 5%, 500V	1C3176
2	C303, 304, 308 309, 312, 319	6	.0015mfd, 20%, 500V	1C1114
3	C310, 317	2	4.7pfd, 5%, 500V	1C3177
4	C313	1	20pfd, 20%, 500V	1C999
5	C316	1	.01mfd, GMV, 600V	1C230

ITEM	CIRCUIT SYMBOL	QTY	DESCRIPTION	PART #
			RESISTORS	
6	R301, 305	2	560 ohm, 10%, $\frac{1}{2}$W	1R1782.5600
7	R302, 309	2	15K, 10%, $\frac{1}{2}$W	1R1782.1502
8	R303, 306, 307 310, 313	5	4.7K, 10%, $\frac{1}{2}$W	1R1782.4701
9	R304	1	18K, 10%, $\frac{1}{2}$W	1R1782.1802
10	R308	1	56K, 10%, $\frac{1}{2}$W	1R1782.5602
11	R311	1	1.2K, 10%, $\frac{1}{2}$W	1R1782.1201
12	R312	1	1K, 10%, $\frac{1}{2}$W	1R1782.1001
13	R314	1	2.7K, 10%, $\frac{1}{2}$W	1R1782.2701
			TRANSISTORS	
14	Q301, 302	2	NPN, Silicon, 2N3662	1V3708
15	Q303, 304	2	NPN, Silicon, *16L43	1V3109
			TRANSFORMERS & COILS	
16	T301			
	(Low-High Band)	1	Antenna transformer	1L3208
	(High-High Band)	1	Antenna transformer	1L3222
17	T302			
	(Low-High Band)	1	RF transformer	1L3215
	(High-High Band)	1	RF transformer	1L3225
18	T303	1	10.7MHz IF transformer	1L3217
19	L302			
	(Low-High Band)	1	RF Coil Assembly	1L3210
	(High-High Band)	1	RF Coil Assembly	1L3223
20	L303	1	RF Choke, 2μh	1L3388
21	L304	1	Oscillator Coil Assembly	1L3212
22	L305			
	(Low-High Band)	1	Oscillator Multiplier Coil Assembly	1L3213
	(High-High Band)	1	Oscillator Multiplier Coil Assembly	1L3224
			MISCELLANEOUS	
23	Y1	1	RF Crystal (Specify RF)	1X3193
24		1	Crystal Socket	1P3129
25		3	RF Can Assembly	1X3135
26		1	High Band RF P.C. Board	1X3184
27		1	High Band RF P.C. Board Assembly	1X3872
	mtg. hdwr.	3	Screw, #4-40, black	1H3180

7.4 TONE FILTER PRINTED CIRCUIT BOARD ASSEMBLY

ITEM	CIRCUIT SYMBOL	QTY	DESCRIPTION	PART #
			CAPACITORS	
1	CS401, 402	3	Tone Filter, Input-Values determined by tone frequency	page 8.1and 8.2
2	CT403	1	Tone Filter, Tank-Value determined by tone frequency	page 8.1and 8.2
3	CT404	1	390pfd, 10%, 33V	1C3834
4	CT405	1	Tone Trimmer, 350-1180pfd	1C1153
	mtg. hwdr.	1	Washer, Lock #12	1H1164
		1	Nut, #12-40	1H1296
			DIODE	
5	CR401	1	Silicon, 400mw, 30V, TI-52	1V3279
			COIL	
6	L401	1	Toroid, Value determined by tone frequency	page 8.1and 8.2
			MISCELLANEOUS	
7		1	Tone Filter P. C. Board	1X3713
8		1	Tone Filter P. C. Board Ass'y. (Specify tone frequency and first or second tone)	1X3714
		1	Rivnut, #A4-85	1H3179
		1	Screw, #4-40	1H3516
		1	Spacer	1H3515
		1	Washer, Flat #6	1H3245
		1	Washer, Lock #4	1H995
		1	Nut, #4-40	1H76

7.5 TONE AMPLIFIER PRINTED CIRCUIT BOARD ASSEMBLY

			CAPACITORS	
1	C501	1	.1mfd, 20%, 50V	1C3878
2	C502	1	4mfd, 25V, Electrolytic	1C1861
3	C503			
	(Single Tone)	1	.82mfd, 20%, 100V	1C3186
	(Duotone)	1	.33mfd, 20%, 100V	1C3187
4	C504	1	22mfd, 20%, 100V	1C3138
5	C505, 506, 507 509, 510, 511 512, 513, 514	9	.01mfd, GMV, 50V	1C230

7.5 PARTS LIST (TONE AMPLIFIER, cont.)

ITEM	CIRCUIT SYMBOL	QTY	DESCRIPTION	PART #
6	C508	1	.05mfd, GMV, 50V	1C2905
			RESISTORS	
7	R501, 507, 508	3	8.2K, 10%, ½W	1R1782.8201
8	R502	1	1.5K, 10%, ½W	1R1782.1501
9	R503, 513	2	6.8K, 10%, ½W	1R1782.6801
10	R504	1	18K, 10%, ½W	1R1782.1802
11	R505, 514	2	15K, 10%, ½W	1R1782.1502
12	R506	1	2.7K, 10%, ½W	1R1782.2701
13	R509, 536	2	390K, 10%, ½W	1R1782.3903
14	R510			
	(Single Tone)	1	3.9M, 10%, ½W	1R1782.3904
	(Duotone)	1	680K, 10%, ½W	1R1782.6803
15	R511			
	(Single Tone)	1	2.2M, 10%, ½W	1R1782.2204
	(Duotone)	1	1.5M, 10%, ½W	1R1782.1504
16	R512	1	330K, 10%, ½W	1R1782.3303
17	R515, 517, 524 525, 527	5	100K, 10%, ½W	1R1782.1003
18	R516			
	(Single Tone)	1	33K, 10%, ½W	1R1782.3302
	(Duotone)	1	15K, 10%, ½W	1R1782.1503
19	R518	1	180K, 10%, ½W	1R1782.1803
20	R520, 542	2	22K, 10%, ½W	1R1782.2202
21	R521	1	3.9K, 10%, ½W	1R1782.3901
22	R522, 529, 533 537	4	470K, 10%, ½W	1R1782.4703
23	R523, 530, 531 534, 535	5	220K, 10%, ½W	1R1782.2203
24	R526	1	82K, 10%, ½W	1R1782.8202
25	R528, 532	2	1.78M, 10%, ½W	1R1780.1784
26	R538	1	1.5M, 10%, ½W	1R1782.1504
			***TRANSISTORS**	
27	Q501, 502	2	NPN, Silicon, *2N2926 brown	1V3096
28	Q503, 504, 505 506, 509, 512	6	NPN, Silicon, *2N2926 yellow	1V3099
29	Q507	1	PNP, Silicon, *2N3702	1V3683
30	Q508	1	NPN, Silicon, *2N2926 red	1V3097
31	Q510, 511	2	NPN, Silicon, *2N2926 orange	1V3098

7.5 PARTS LIST (TONE AMPLIFIER, cont.)

ITEM	CIRCUIT SYMBOL	QTY	DESCRIPTION	PART #
			DIODES	
32	CR501, 502, 503 504, 505	5	Silicon, 400mw, 30V, TI-52	1V3279
33	CR507	1	Germanium, 80mw, 80V, 1N198	1V947
			MISCELLANEOUS	
34	Single Tone	1	Tone Amplifier, P. C. Board	1X3693
	Duotone	1	Tone Amplifier, P. C. Board	1X3694
35	Single Tone	1	Tone Amp. P. C. Board Ass'y.	1X3696
	Duotone	1	Tone Amp. P. C. Board Ass'y.	1X3697
	mtg. hdwr.	4	Screw, #4-40	1H95
		4	Washer, Lock, #4	1H995

7.6 IF-AUDIO PRINTED CIRCUIT BOARD ASSEMBLY

ITEM	CIRCUIT SYMBOL	QTY	DESCRIPTION	PART #
			CAPACITORS	
1	C601, 603, 606 608, 610, 612 615, 622, 635	9	.05mfd, GMV, 50V	1C2905
2	C602, 604, 607 609, 611, 613 614, 627	8	.01mfd, GMV, 600V	1C230
3	C605	1	75pfd, 20%, 500V	1C222
4	C616, 620	2	.0015mfd, 20%, 400V	1C1114
5	C617	1	190pfd, 5%, 500V	1C3467
6	C618	1	6.8mfd, minimum WVDC 10	1C3763
7	C619	1	680pfd, 20%, 100V	1C3292
8	C621, 623, 625 638	4	.33mfd, 20%, 100V	1C3187
9	C624	1	4mfd, 20%, 100V	1C1864
10	C626	1	.22mfd, 20%, 25V	1C3773
11	C629	1	6.8mfd, minimum WVDC 35	1C3763
12	C630	1	100mfd, 25V	1C3514
13	C631, 632, 633	3	.01mfd, 20%, 100V	1C3832
14	C634, 636	2	.047mfd, 20%, 100V.	1C3833
15	C637	1	.1mfd, 20%, 50V	1C3878
			RESISTORS	
16	R601, 649, 654 665, 667, 668	6	10K, 10%, ½W	1R1782.1002

7.6 PARTS LIST (IF-AUDIO cont.)

ITEM	CIRCUIT SYMBOL	QTY	DESCRIPTION	PART #
17	R602	1	68K, 10%, $\frac{1}{2}$W	1R1782.6802
18	R603, 622	2	2.7K, 10%, $\frac{1}{2}$W	1R1782.2701
19	R604, 611, 638 662	4	18K, 10%, $\frac{1}{2}$W	1R1782.1802
20	R605, 613, 617 626, 629, 647 657	7	100K, 10%, $\frac{1}{2}$W	1R1782.1003
21	R606, 648, 659 663, 664	5	2.2K, 10%, $\frac{1}{2}$W	1R1782.2201
22	R607, 653	2	6.8K, 10%, $\frac{1}{2}$W	1R1782.6801
23	R608, 619, 634 639	4	22K, 10%, $\frac{1}{2}$W	1R1782.2202
24	R609, 637, 651 655	4	470 ohm, 10%, $\frac{1}{2}$W	1R1782.4700
25	R610, 614, 618	3	4.7K, 10%, $\frac{1}{2}$W	1R1782.4701
26	R612, 616, 620	3	1.5K, 10%, $\frac{1}{2}$W	1R1782.1501
27	R615	1	39K, 10%, $\frac{1}{2}$W	1R1782.3902
28	R621, 660	2	82K, 10%, $\frac{1}{2}$W	1R1782.8202
29	R623	1	5.6K, 10%, $\frac{1}{2}$W	1R1782.5601
30	R624	1	47 ohm, 10%, $\frac{1}{2}$W	1R1782.47R0
31	R625, 628, 632 633, 658	5	33K, 10%, $\frac{1}{2}$W	1R1782.3302
32	R627, 630, 631	3	1K, 10%, $\frac{1}{2}$W	1R1782.1001
33	R635, 644	2	330K, 10%, $\frac{1}{2}$W	1R1782.3303
34	R636	1	56K, 10%, $\frac{1}{2}$W	1R1782.5602
35	R640, 661	2	12K, 10%, $\frac{1}{2}$W	1R1782.1202
36	R641	1	220 ohm, 10%, $\frac{1}{2}$W	1R1782.2200
37	R642	1	22 ohm, 10%, $\frac{1}{2}$W	1R1782.22R0
38	R643	1	2.7 ohm, 10%, 2W	1R1916.2R70
39	R645	1	470K, 10%, $\frac{1}{2}$W	1R1782.4703
40	R646	1	120K, 10%, $\frac{1}{2}$W	1R1782.1203
41	R650, 652	2	47K, 10%, $\frac{1}{2}$W	1R1782.4702
42	R656	1	33 ohm, 10%, $\frac{1}{2}$W	1R1782.33R0
43	R669	1	180K, 10%, $\frac{1}{2}$W	1R1782.1803
			TRANSISTORS	
44	Q601, 603	2	NPN, Silicon, *2N3854	1V3109
45	Q602, 604, 605 606, 607, 608	6	NPN, Silicon, *2N3859	1V3699
46	Q609	1	NPN, Silicon, *2N2926 green	1V3100
47	Q610	1	NPN, Silicon, *2N2926 yellow	1V3099
48	Q611, 612	2	PNP, Germanium, 2N178	1V2980
	mtg. hdwr.	2	Screw, #6-32	1H35
		2	Washer, Lock, #6	1H264
		2	Nut, #6-32	1H1002

7.6 PARTS LIST (IF-AUDIO cont.)

ITEM	CIRCUIT SYMBOL	QTY	DESCRIPTION	PART #
49	Q613, 614, 615	3	NPN, Silicon, *2N2926 brown	1V3096
50	Q616	1	NPN, Silicon, 2N3414	1V3672
51	Q617, 618, 619 620	4	NPN, Silicon, *2N2926 orange	1V3098
			DIODES	
52	CR601, 602, 603	3	Germanium, 1N87	1V3104
53	CR604, 605	2	Silicon, A13FX2000	1V3673
			TRANSFORMERS & CHOKES	
54	T601	1	10.7MHz IF transformer	1L3161
55	T602	1	10.7MHz IF transformer	1L3253
56	T603	1	Oscillator coil assembly	1L3557
57	T604, 605, 606	3	455kHz IF transformer	1L3124
58	T607	1	455kHz Discriminator	1L3125
59	T608	1	Audio Driver transformer	1L2663
60	T609	1	Audio Output transformer	1L2664
61	L601	1	20mh choke	1L3280
			MISCELLANEOUS	
62	Y1	1	11.155MHz crystal	1X3194
63		1	IF-Audio P. C. Board	1X3789
		1	IF-Audio P. C. Board Ass'y.	
			w/squelch & w/alert light	1X3793
			w/squelch & w/o alert light	1X3792
	mtg. hdwr.	9	Screw, #4-40	1H95
		9	Washer, Lock #4	1H995

* The following is a list of acceptable replacements for transistors used in the Plectron transistorized receiver.

Type	Part #	Replacement	Part #
16L43	1V3109	2N3854	1V3109
16L64	1V3110	2N3855	1V3110
2N2926 Brown	1V3096	2N3393	1V3873
2N2926 Red	1V3097	2N3393	1V3873
2N2926 Orange	1V3098	2N3393	1V3873
2N2926 Yellow	1V3099	2N3393	1V3873
2N2926 Green	1V3100	2N2925	1V3100
2N3638	1V3758	2N3702	1V3683
2N3702	1V3683	2N3638	1V3758
2N3859	1V3699	2N2716	1V3108

7.7 CHIEF TRANSISTOR RECEIVER

ITEM	CIRCUIT SYMBOL	QTY	DESCRIPTION	PART #
1	R701	1	Potentiometer, 2K, $\frac{1}{4}$W, 30% Volume control	1R2912
2	R702	1	Potentiometer, 15K, 1/3W, 30%, Squelch control	1R2911
3		2	Knob	1X2910
4	R704	1	Resistor, 1M, 20%, $\frac{1}{2}$W	1R1782.1004
5	C701	1	Capacitor, 100μfd, Electrolytic	1C3514
6	C702, 703	2	Capacitor, .0022μfd	1C3680
7	DS701	1	Pilot Lamp, #756	1V3750
8	XDS701	1	Socket, Lamp	1P3749
9	LS701	1	Speaker, 3" x 5"	1L3080
	mtg. hdwr.	4	Screw, #6-32	1H2950
10		1	Lens, Red	1X2738
11	T701	1	Transformer, Power	1L3764
	mtg. hwdr.	2	Screw, #8-32	1H101
		2	Washer, Lock #8	1H332
		2	Nut, #8-32	1H82
12	BT701, 702	2	Battery, PEP (Optional)	1X3258
	mtg. hdwr.	2	Battery holder assembly	1X3302
		2	Screw, #6-32	1H2950
13	J701, 702	2	Jack, Remote speaker and External antenna	1P2918
14	J703	1	Power Plug	1P3018
15	Low Band	1	Antenna, Telescoping (Optional)	1A3016
	High Band	1	Antenna, Telescoping (Optional)	1A3017
16	Low Band	1	Antenna	1A821
	High Band	1	Antenna	1A818
17		2	Cable Strap	1X3508
18		1	Wiring Harness	1W3822
19	S701	1	Switch, Alert-Monitor	1S3452
20	S702	1	Switch, Alert-Reset	1S3131
21	S703	1	Switch, ON-OFF DUTY	1S1154
22	S704	1	Switch, 117 VAC & PORTABLE-MOBILE	1S3387
23		1	Handle	1X2734
24		1	Grill Screen, Handle end	1X2960
	mtg. hwdr.	2	Screw, #6-32	1H2955
25		1	Grill Screen, Solid end	1X2959
26		1	Chassis Top Assembly	1X3316
	mtg. hwdr.	2	Screw, #6-32	1H2950
27		1	Chassis Bottom Assembly	1X3334
	mtg. hwdr.	2	Screw, #6-32	1H2950
28		4	Nut, Tinnerman, #6-32	1H2916
29		4	Screw, #6-32	1H35
30		4	Washer, Lock, #6	1H264

7.7 PARTS LIST (CHIEF RECEIVER, cont.)

ITEM	CIRCUIT SYMBOL	QTY	DESCRIPTION	PART #
31		1	Cabinet Shell Assembly	
			w/o Duty Switch	1X3372
			w/Dity Switch	1X3374
	mtg. hdwr.	4	Screw, #6-32	1H2917
32		1	Cable, Power AC	1W3015
33		1	Baffle, Assembly, Speaker	1X3881

ACCESSORIES

ITEM	CIRCUIT SYMBOL	QTY	DESCRIPTION	PART #
34			Cable, Power DC	1W3014
35			Cable, Power DC w/cigarette lighter adapter plug	1W3070
36			Cigarette lighter adapter plug	1P3069
37			Remote Speaker Cable Ass'y. (Specify length)	1X3548
38			Remote Speaker Arrangement (Specify cable length)	1X3549
39			Remote Speaker	1X800
40			Mobile Mounting Bracket	1X3300
41			Mobile Antenna & Adapter Assembly	1X2341
42	Low Band		Antenna, Half-Wave Dipole	1A1372
	High Band		Antenna, Half-Wave Dipole	1A1098
43	Low Band		Antenna, Ground Plane	1A2426
	High Band		Antenna, Ground Plane	1A2428

NOTE: See Plectron Accessories Sheet (next to last page in this manual) for other accessories.

TONE FILTER PARTS VALUES
TRANSISTOR RECEIVER

TOROID 3 HENRY - - - Lead color - - - Blue - - - Part # 1L1365

-2% +2%	Tone Freq.	Input Cap.	Part #	Tank Cap.	Part #
630-656	643 Hz	1141 pf	1C1415	18000 pf	1C1394
659-685	672 Hz	1047 pf	1C1414	16400 pf	1C1395
687-715	701 Hz	982 pf	1C1413	14970 pf	1C1396
717-747	732 Hz	872 pf	1C1411	13620 pf	1C1397
750-780	765 Hz	*820 pf	1C3746	12400 pf	1C1398
783-815	799 Hz	*750 pf	1C3745	11300 pf	1C1399
817-851	834 Hz	674 pf	1C1406	10270 pf	1C1400
854-888	871 Hz	*620 pf	1C3744	9330 pf	1C1401

TOROID 1.5 HENRY - - - Lead color - - - Brown - - - Part # 1L1366

-2% +2%	Tone Freq.	Input Cap.	Part #	Tank Cap.	Part #
892-928	910 Hz	982 pf	1C1413	18000 pf	1C1394
931-968	950 Hz	910 pf	1C3747	16400 pf	1C1395
972-1012	992 Hz	*820 pf	1C3746	14970 pf	1C1396
1015-1057	1036 Hz	*750 pf	1C3745	13620 pf	1C1397
1060-1104	1082 Hz	712 pf	1C1407	12400 pf	1C1398
1107-1153	1130 Hz	647 pf	1C1405	11300 pf	1C1399
1156-1204	1180 Hz	*620 pf	1C3744	10270 pf	1C1400
1207-1257	1232 Hz	*510 pf	1C3743	9330 pf	1C1401

TOROID 0.750 HENRY - - - Lead color - - - Violet - - - Part # 1L1367

-2% +2%	Tone Freq.	Input Cap.	Part #	Tank Cap.	Part #
1261-1313	1287 Hz	910 pf	1C3747	18000 pf	1C1394
1317-1371	1344 Hz	*820 pf	1C3746	16400 pf	1C1395
1375-1431	1403 Hz	*750 pf	1C3745	14970 pf	1C1396
1436-1494	1465 Hz	674 pf	1C1406	13620 pf	1C1397
1499-1561	1530 Hz	647 pf	1C1405	12400 pf	1C1398
1566-1630	1598 Hz	589 pf	1C1403	11300 pf	1C1399
1636-1702	1669 Hz	551 pf	1C1402	10270 pf	1C1400
1708-1778	1743 Hz	*504 pf	1X1978	9330 pf	1C1401

TOROID 0.375 HENRY - - - Lead color - - - Yellow - - - Part # 1L1368

-2% +2%	Tone Freq.	Input Cap.	Part #	Tank Cap.	Part #
1784-1856	1820 Hz	872 pf	1C1411	18000 pf	1C1394
1863-1939	1901 Hz	776 pf	1C1409	16400 pf	1C1395
1945-2025	1985 Hz	*750 pf	1C3745	14970 pf	1C1396

TOROID 0.375 HENRY - - - Lead color - - - Yellow - - - Part # 1L1368 (cont.)

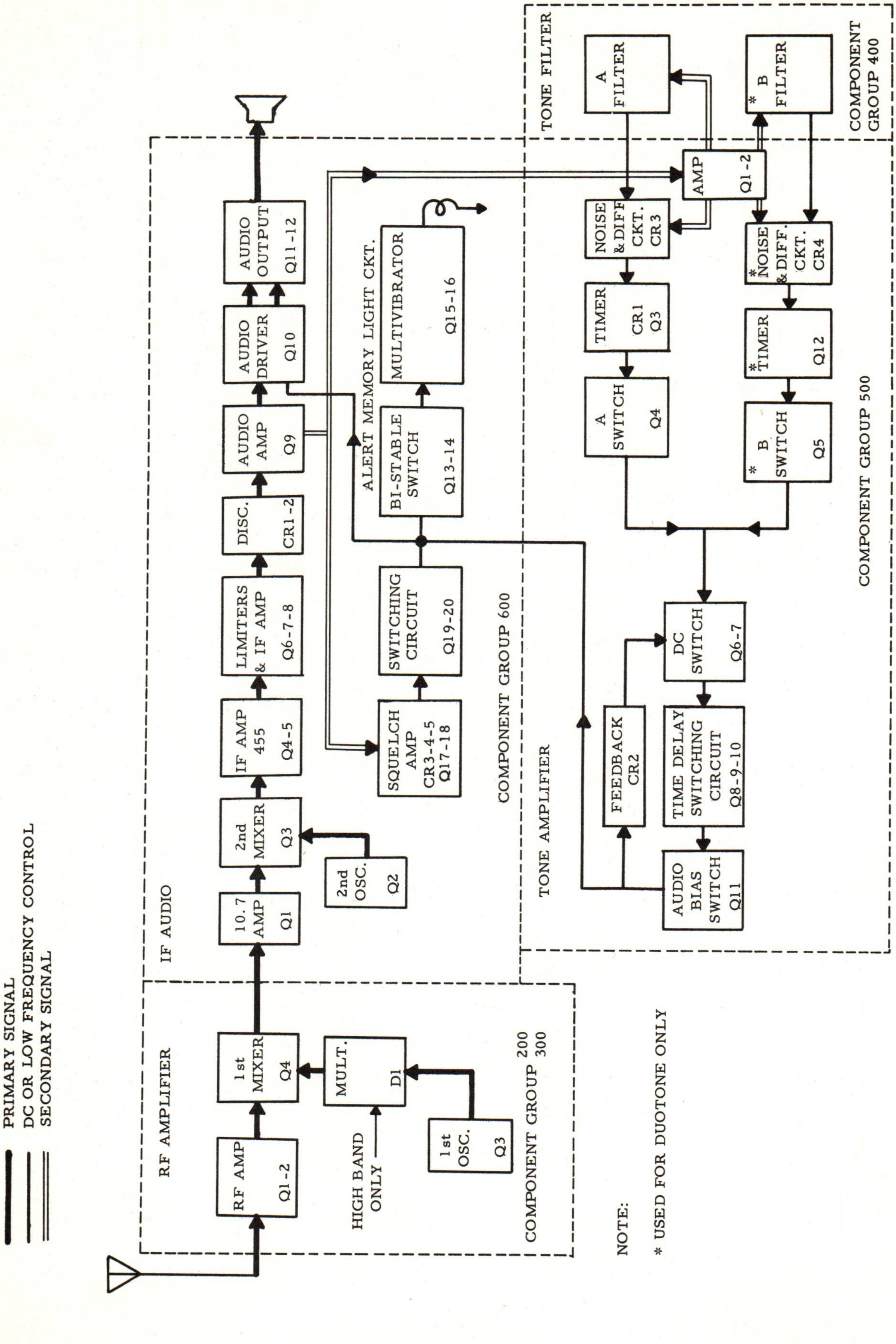
-2% +2%	Tone Freq.	Input Cap.	Part #	Tank Cap.	Part #
2032-2114	2073 Hz	647 pf	1C1405	13620 pf	1C1397
2121-2207	2164 Hz	*620 pf	1C3744	12400 pf	1C1398
2215-2305	2260 Hz	551 pf	1C1402	11300 pf	1C1399
2314-2408	2361 Hz	*510 pf	1C3743	10270 pf	1C1400
2416-2514	2465 Hz	460 pf	1C3543	9330 pf	1C1401

TOROID 0.1875 HENRY - - - Lead color - - - Red - - - Part # 1L1980

-2% +2%	Tone Freq.	Input Cap.	Part #	Tank Cap.	Part #
2523-2627	2575 Hz	872 pf	1C1411	18000 pf	1C1394
2634-2742	2688 Hz	*820 pf	1C3746	16400 pf	1C1395
2751-2863	2807 Hz	*750 pf	1C3745	14970 pf	1C1396
2872-2992	2932 Hz	674 pf	1C1406	13620 fp	1C1397
3001-3123	3062 Hz	*620 pf	1C3744	12400 pf	1C1398
3133-3261	3197 Hz	551 pf	1C1402	11300 pf	1C1399
3272-3406	3339 Hz	*510 pf	1C3743	10270 pf	1C1400
3417-3557	3487 Hz	460 pf	1C3543	9330 pf	1C1401

* The following is a list of acceptable replacements for Input Capacitors used on the Tone Filter in Plectron transistorized receivers.

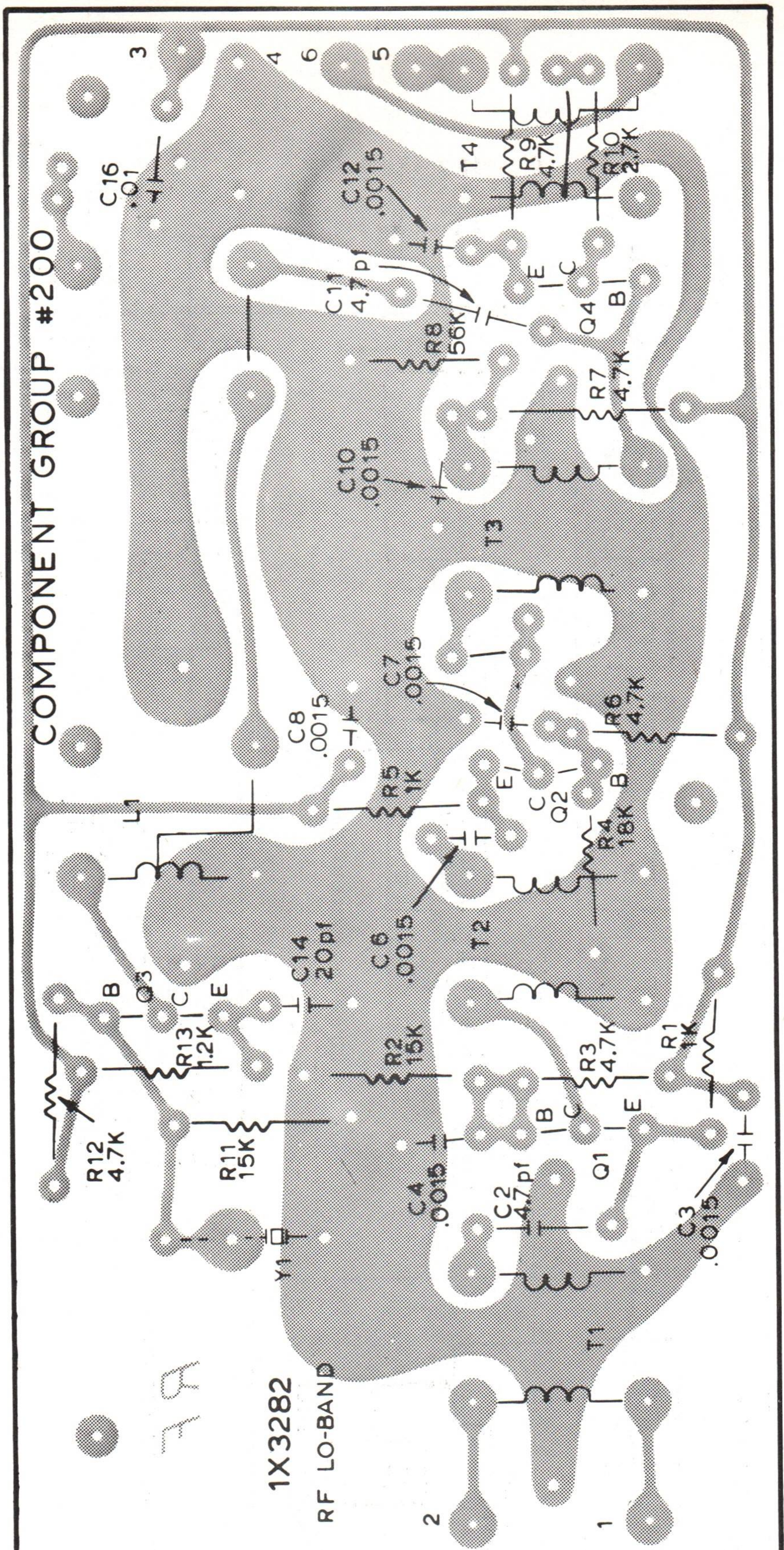
Original	Replacement	Part #
504 pf	510 pf	1C3743
510 pf	504 pf	1C1978
620 pf	611 pf	1C1404
750 pf	741 pf	1C1408
820 pf	811 pf	1C1410



NOTE:

* USED FOR DUOTONE ONLY

FIG. 1 (Rev. 1) CHIEF BLOCK DIAGRAM



414-415-416 FIG. 2 (Rev. 1) RF LO-BAND PRINTED CIRCUIT BOARD

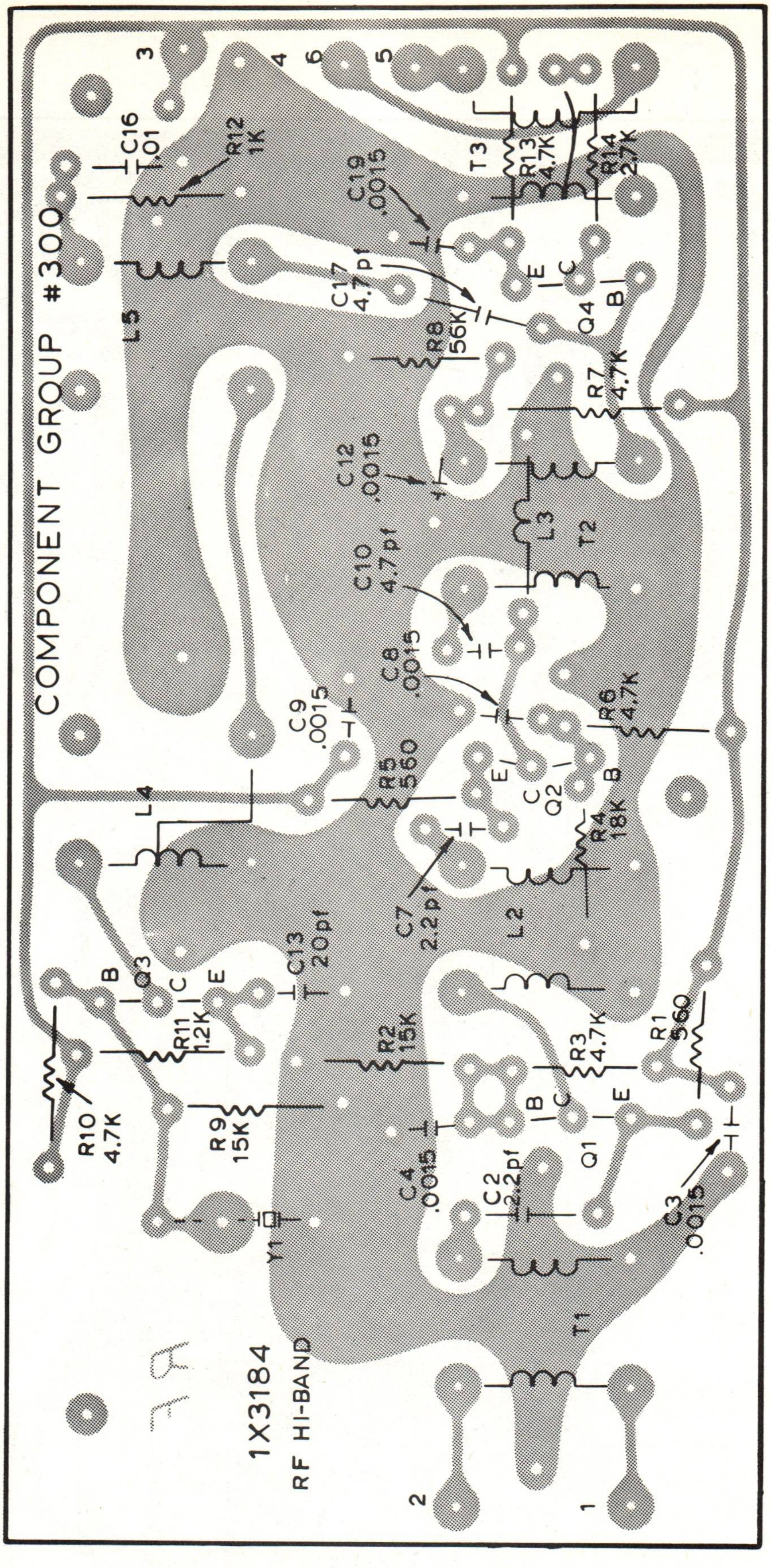
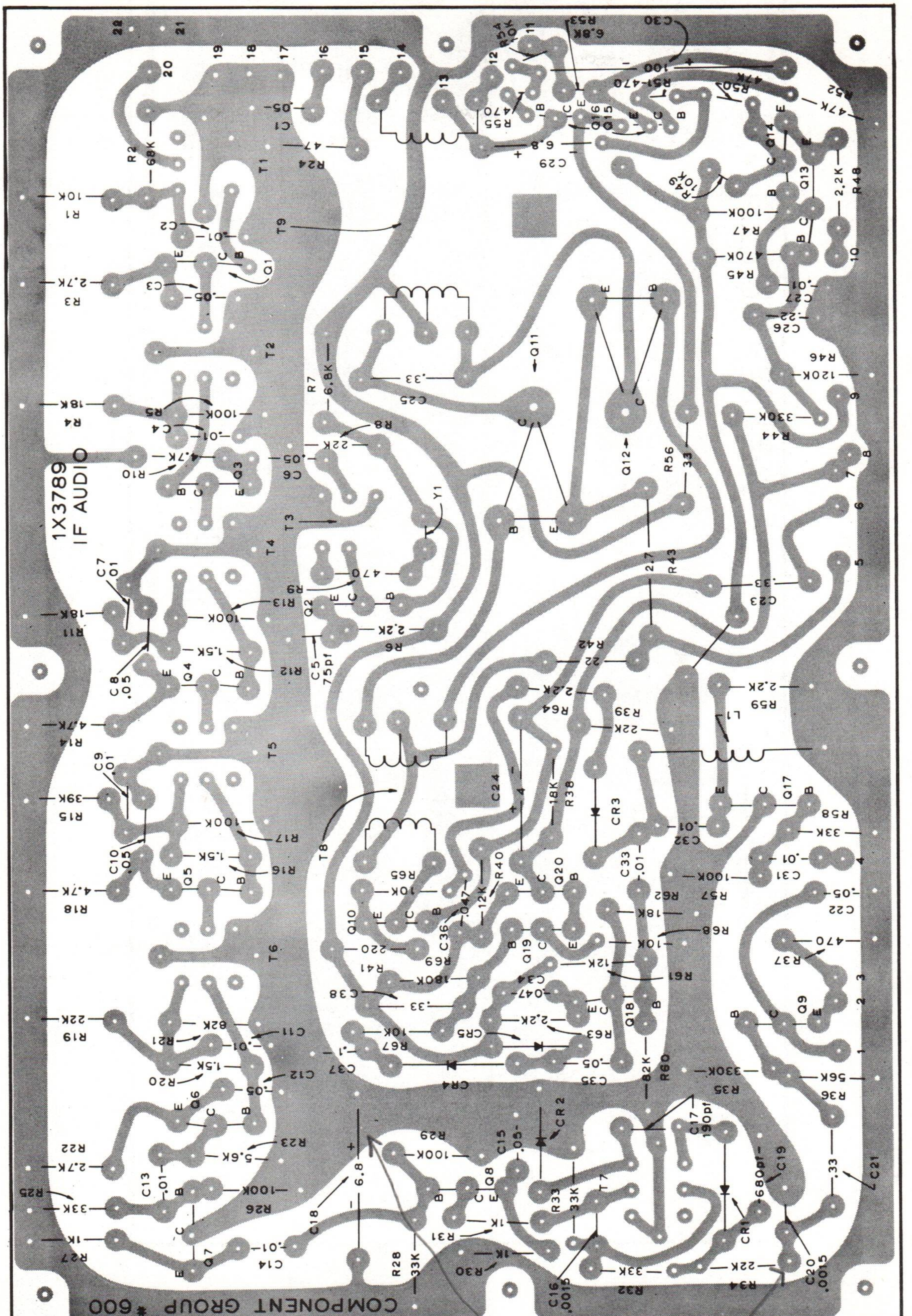
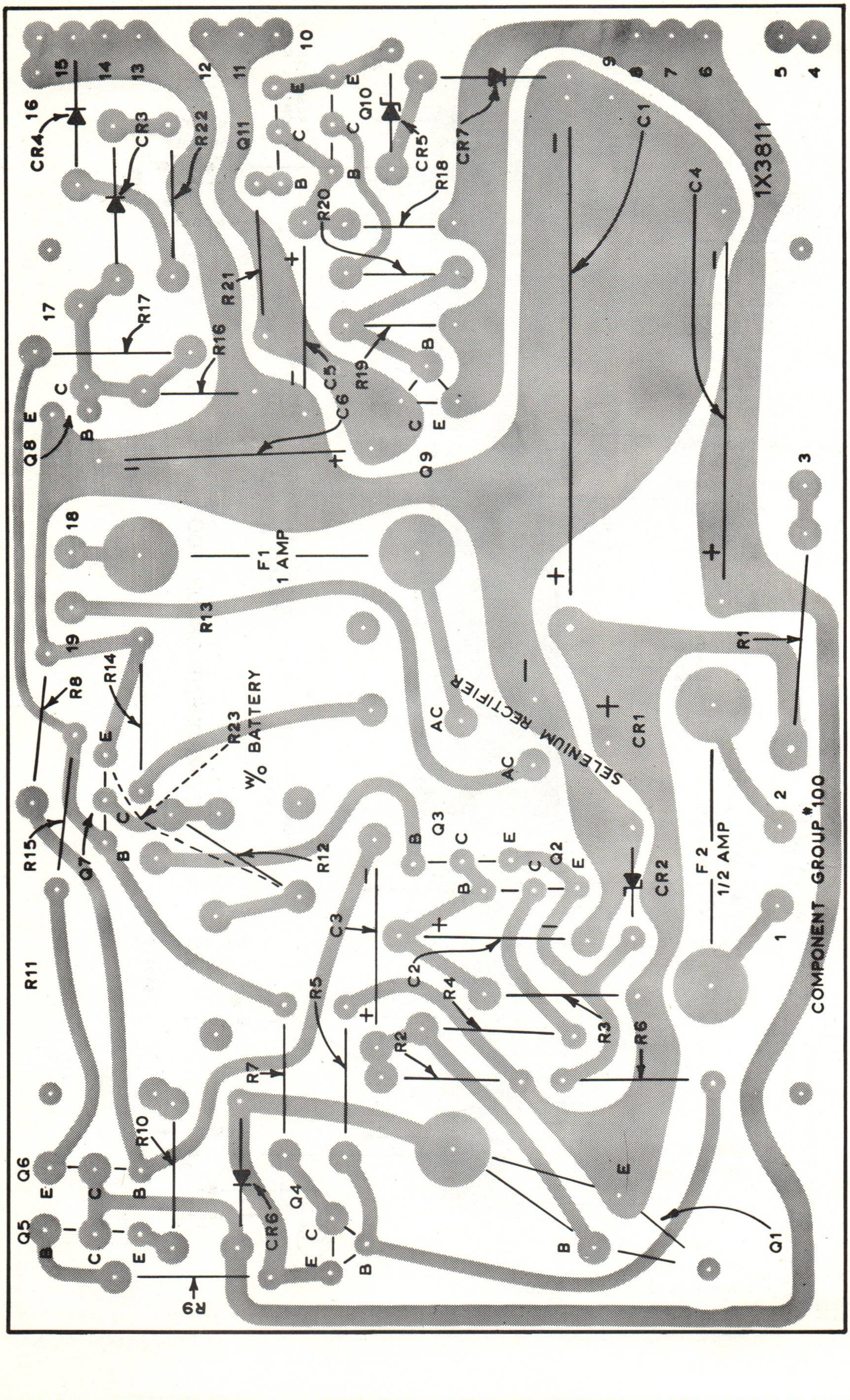


FIG. 3 (Rev. 1) RF HI-BAND PRINTED CIRCUIT BOARD



DISC

414-415-416 FIG. 4 (Rev. 1) IF AUDIO PRINTED CIRCUIT BOARD



414-415-416 FIG. 5 (Rev. 1) POWER SUPPLY PRINTED CIRCUIT BOARD

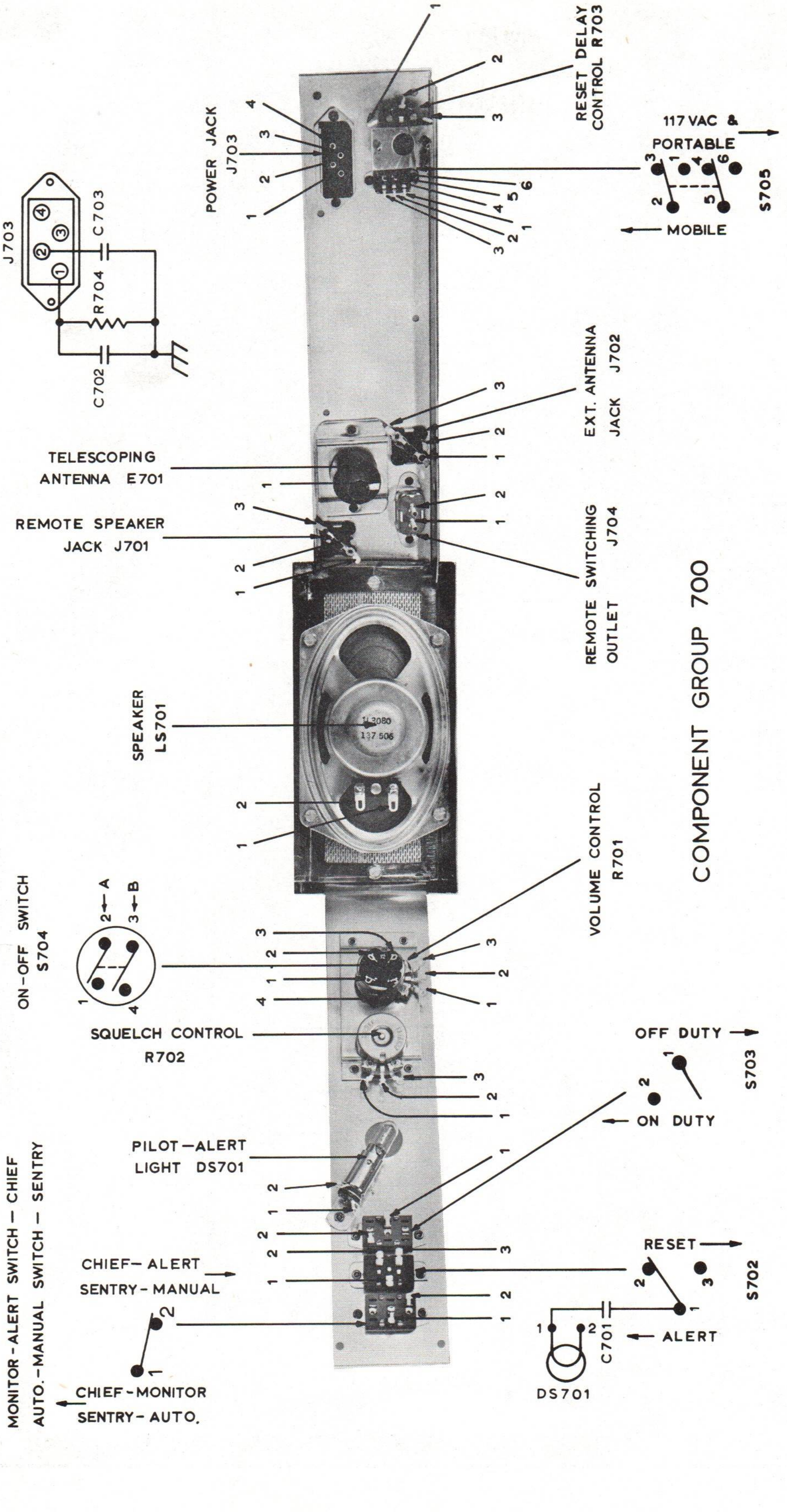


FIG. 6 (Rev. 1) TERMINAL LAYOUT

10.7 XTAL SET LEVEL 3 ATTEN 1 OR 2

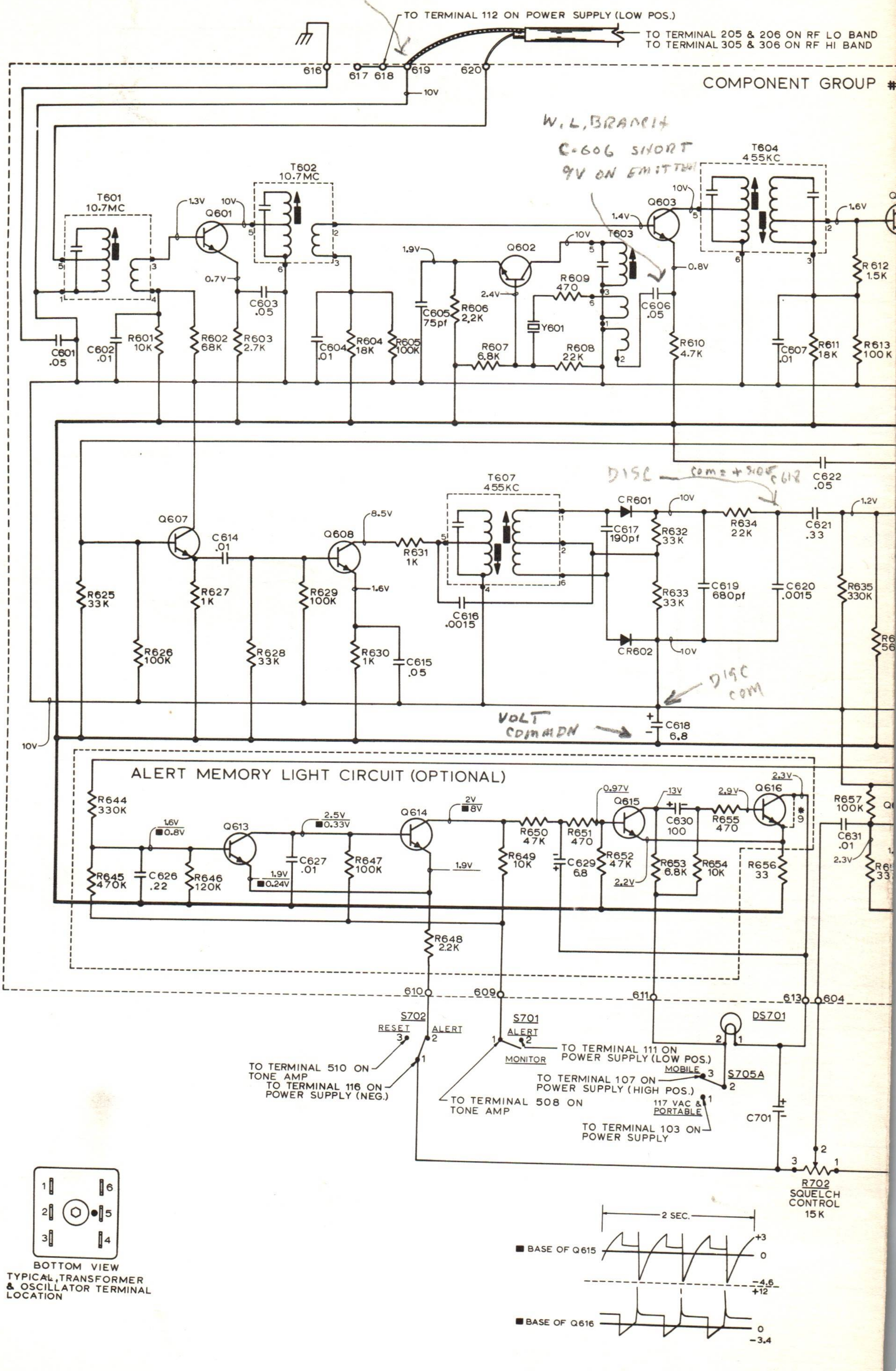
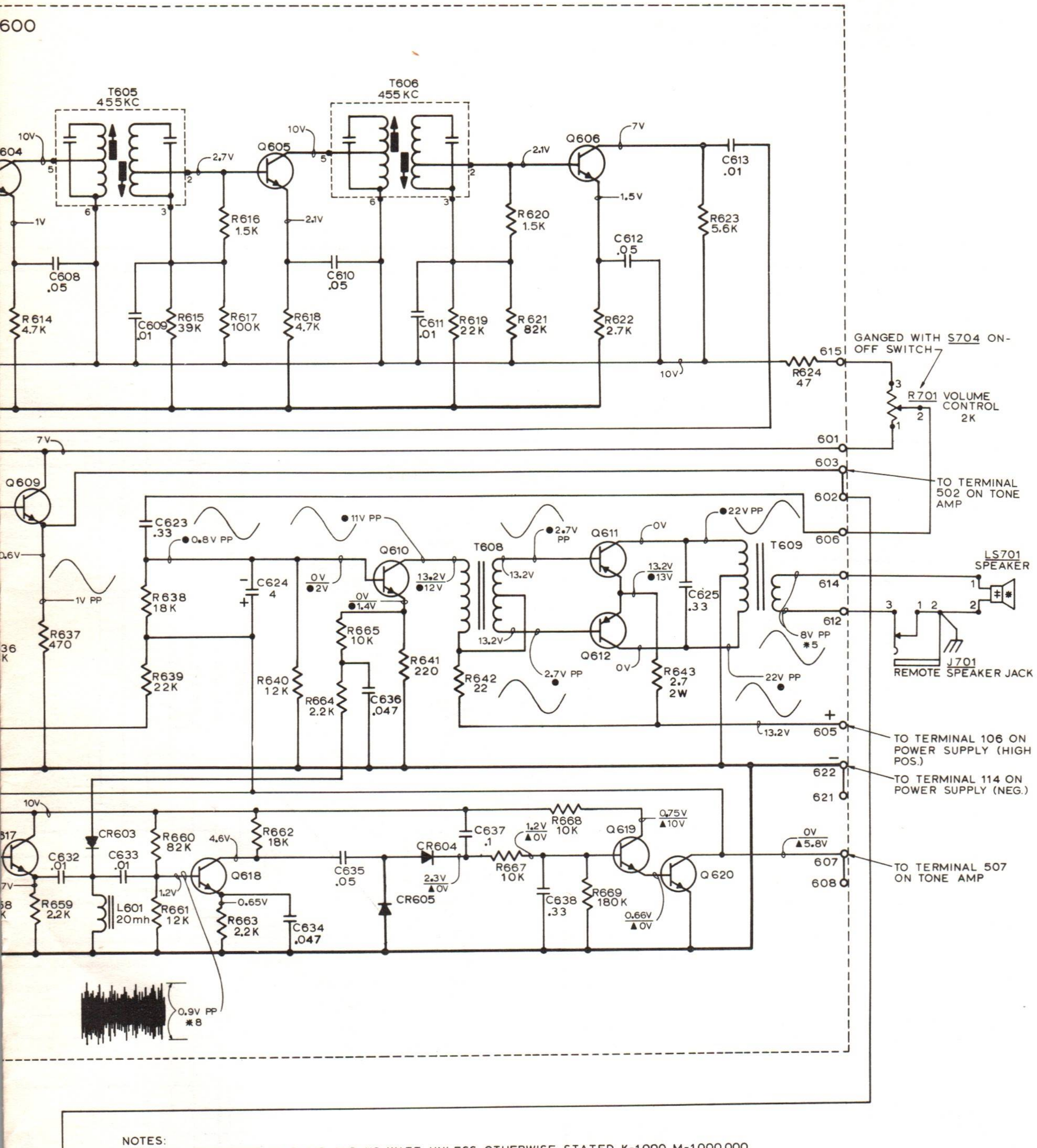
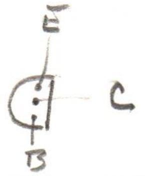


FIG. 8 (Rev. 1) CHIEF IF AUDIO SCHEMATIC



NOTES:
1. ALL RESISTORS IN OHMS AND 1/2 WATT UNLESS OTHERWISE STATED. K=1,000, M=1,000,000.
2. ALL CAPACITANCE VALUES IN MICROFARADS UNLESS OTHERWISE STATED.
3. REFER TO TERMINAL LAYOUT FOR TERMINAL LOCATIONS. (FIG. 6)
4. ⟜ INDICATES VOLTAGE READING LOCATIONS MEASURED TO COMMON NEGATIVE.
*5. IS MEASURED BETWEEN 612 AND 614.
6. VOLTAGES ARE DC UNLESS OTHERWISE INDICATED AND MEASURED WITH AN 11 MEG VTVM WITH NO SIGNAL APPLIED, ABOVE LINE READINGS WITH MAX. SQUELCH, BELOW LINE AS FOLLOWS:
   - ■ = TONE ACTIVATED.
   - ● = AUDIO CIRCUIT ACTIVATED.
   - ▲ = MONITOR OPERATION, MIN. SQUELCH.
7. AC VOLTAGE READING ARE MADE WITH 5 kHz DEVIATION, 1 kHz TONE, 10 µV RF INPUT, MAX. UNDISTORTED VOLUME AND MIN. SQUELCH.
*8. IS MEASURED WITH MAX. SQUELCH AND NO RF INPUT.
*9. JUMPER IS USED WHEN ALERT MEMORY LIGHT CIRCUIT IS OMITTED.
10. IF ALERT MEMORY LIGHT CIRCUIT IS OMITTED, ALL ASSOCIATED SWITCHES AND WIRES REMAIN CONNECTED AS SHOWN.



BOTTOM VIEW
2N 3854
(Q 603)

NOTES:

1. 117 VAC & PORTABLE-MOBILE SWITCH IN 117 VAC & PORTABLE POSITION.
2. ON-OFF SWITCH, TERMINALS 1 & 2 ARE SECTION 'A', TERMINALS 3 & 4 ARE SECTION 'B'.
3. 117 VAC & PORTABLE - MOBILE SWITCH, TERMINALS 1,2&3 ARE SECTION 'A', TERMINALS 4,5&6 ARE SECTION 'B'.
4. ALERT-MONITOR SWITCH IN MONITOR POSITION.
5. RESET SWITCH IN STANDBY POSITION.
6. DUTY SWITCH IN ON-DUTY POSITION.
7. ON-OFF SWITCH IN OFF POSITION.

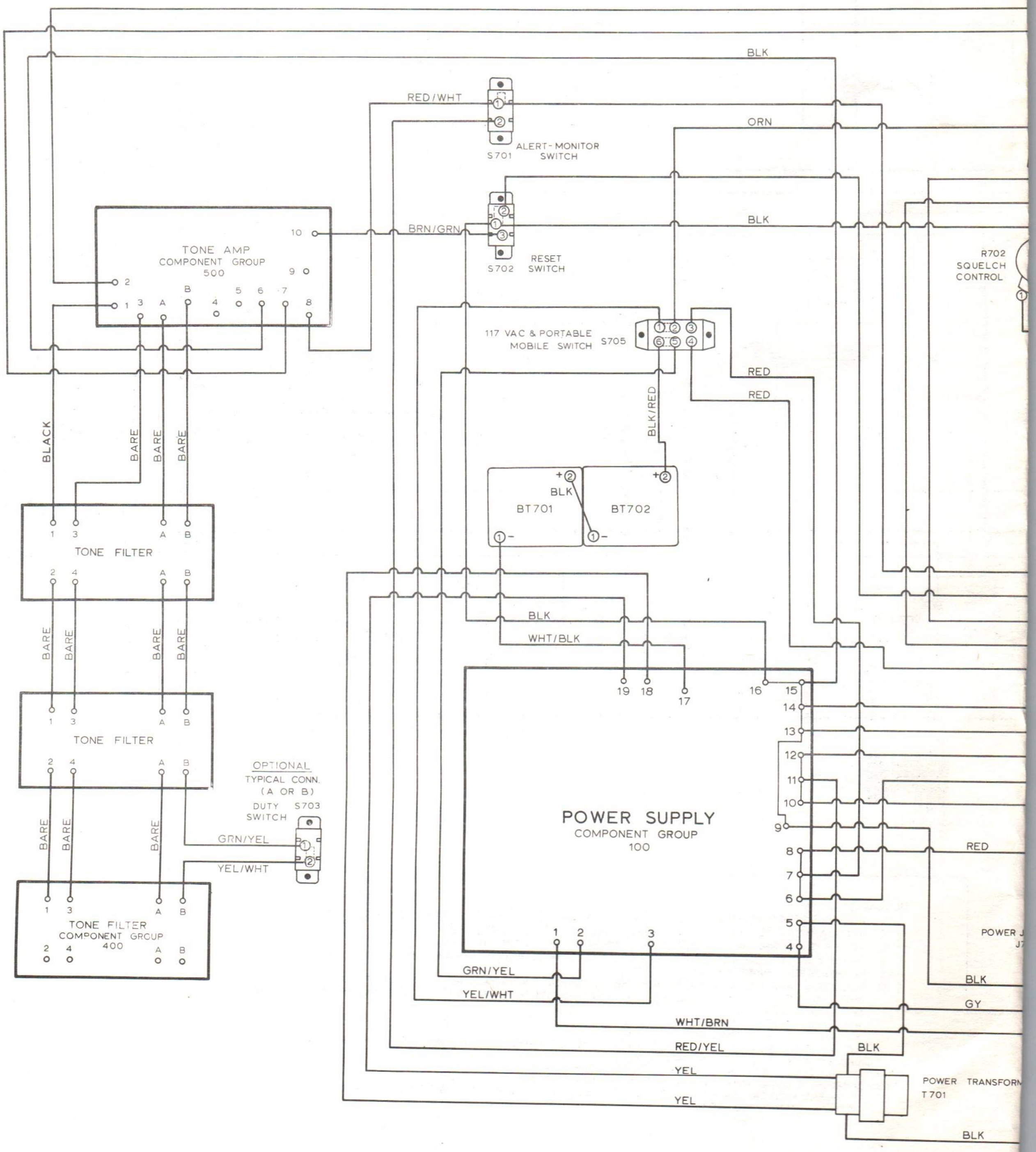
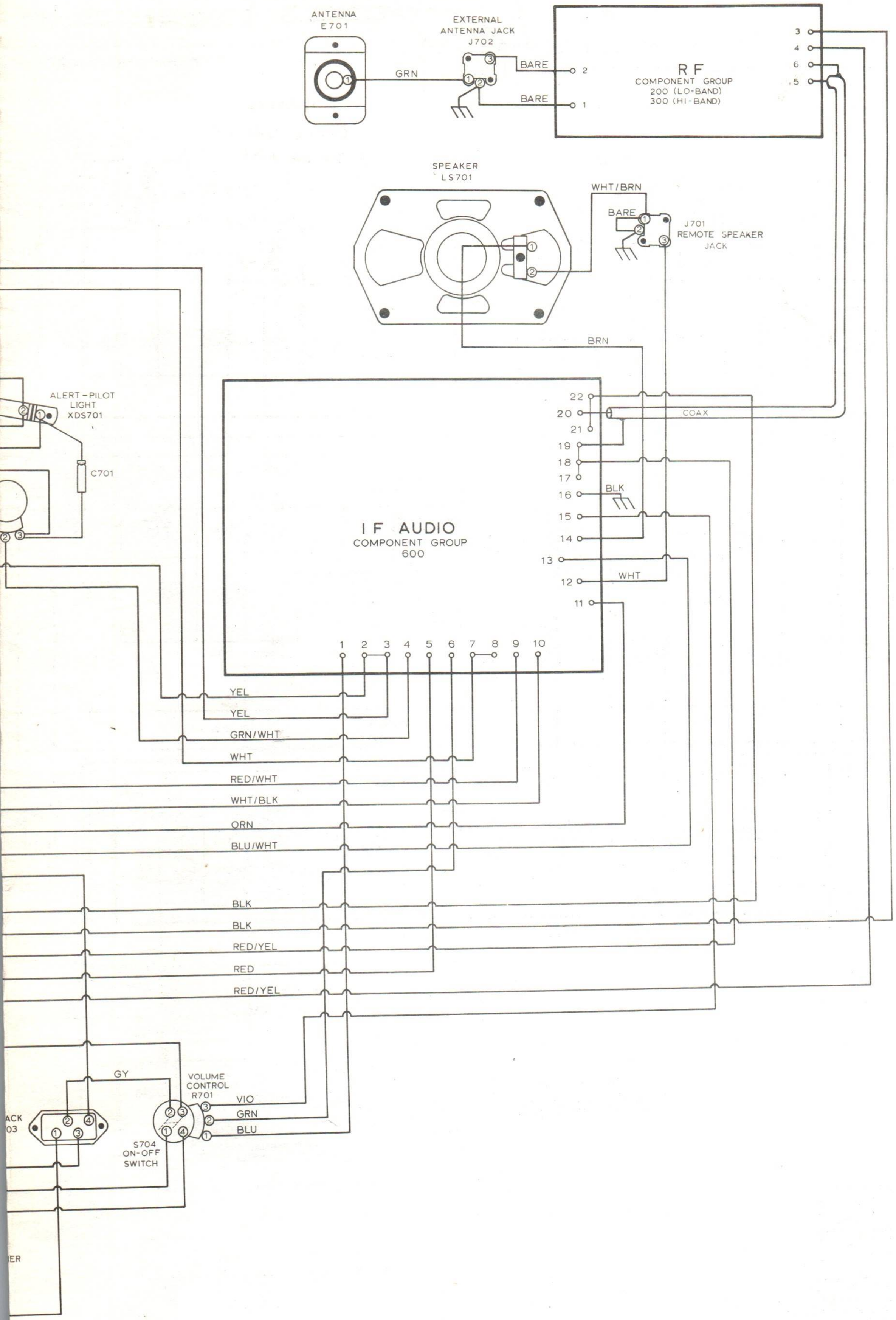
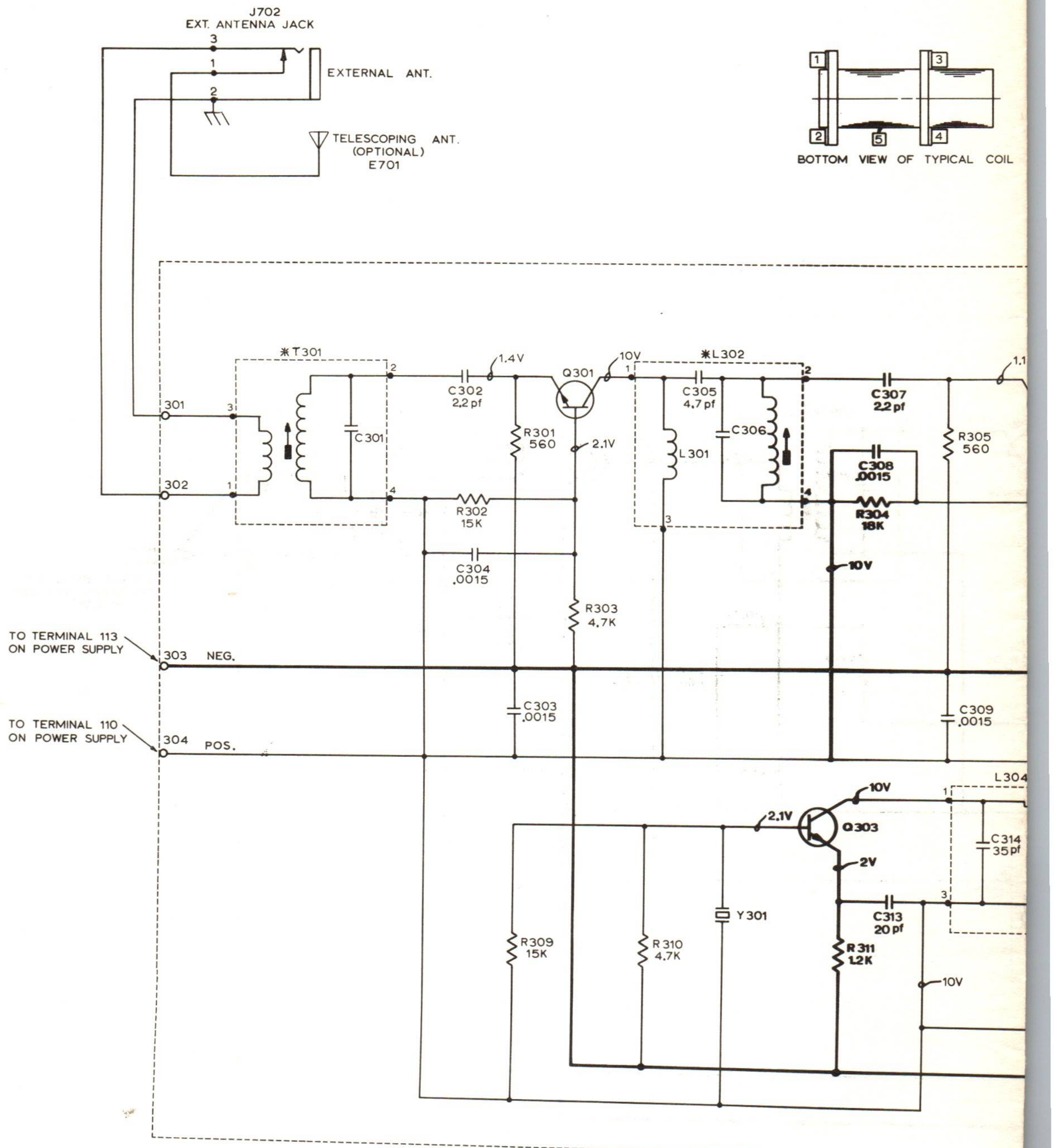


FIG. 7 (Rev. 1) CHIEF WIRING DIAGRAM


ANTENNA
E701
EXTERNAL
ANTENNA JACK
J702
GRN
BARE
BARE
R F
COMPONENT GROUP
200 (LO-BAND)
300 (HI-BAND)
SPEAKER
LS701
WHT/BRN
BARE
J701
REMOTE SPEAKER
JACK
BRN
ALERT-PILOT
LIGHT
XDS701
C701
COAX
BLK
WHT
I F AUDIO
COMPONENT GROUP
600
YEL
YEL
GRN/WHT
WHT
RED/WHT
WHT/BLK
ORN
BLU/WHT
BLK
BLK
RED/YEL
RED
RED/YEL
GY
VOLUME
CONTROL
R701
VIO
GRN
BLU
S704
ON-OFF
SWITCH
ACK
03
ER

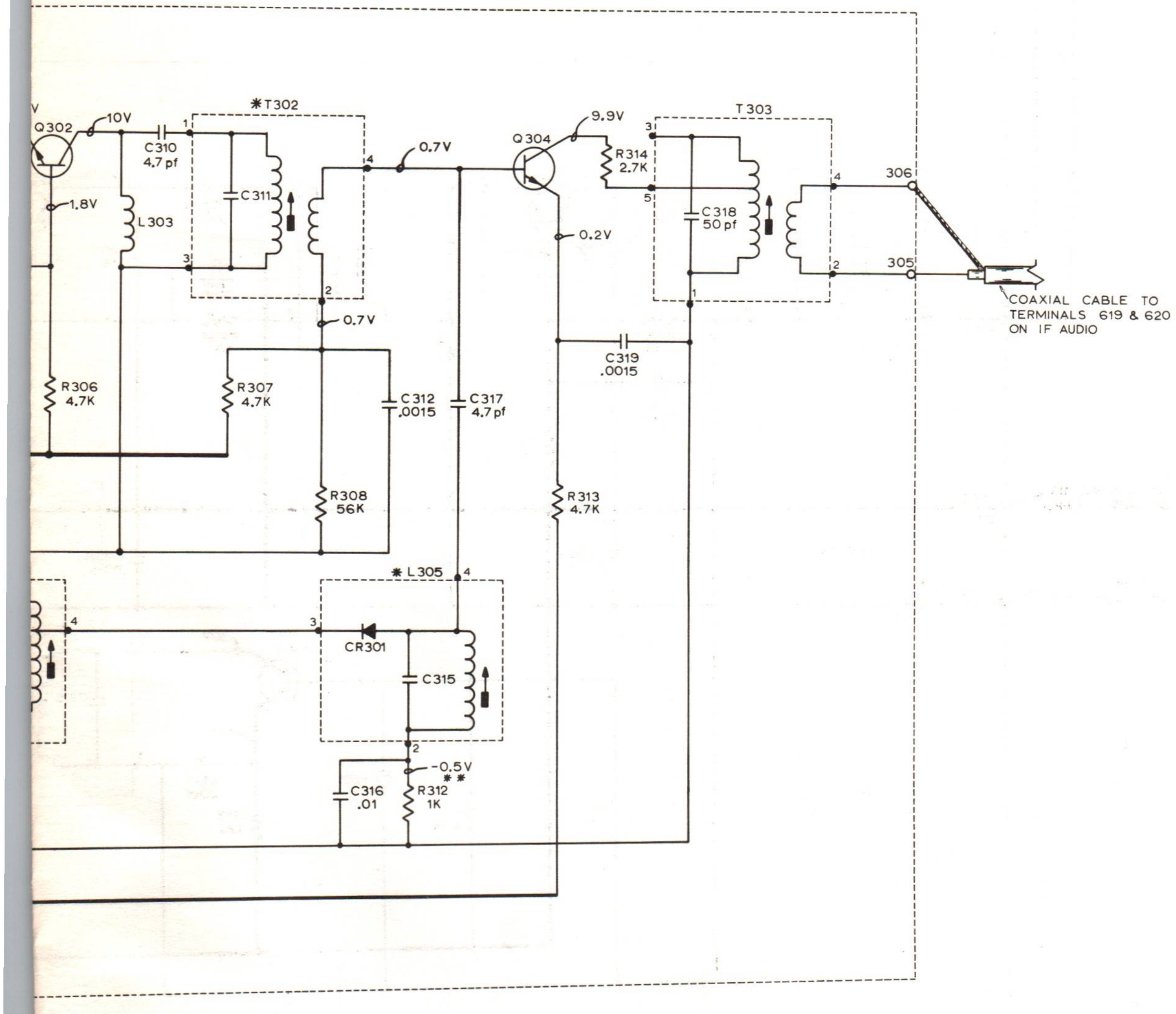


NOTES:

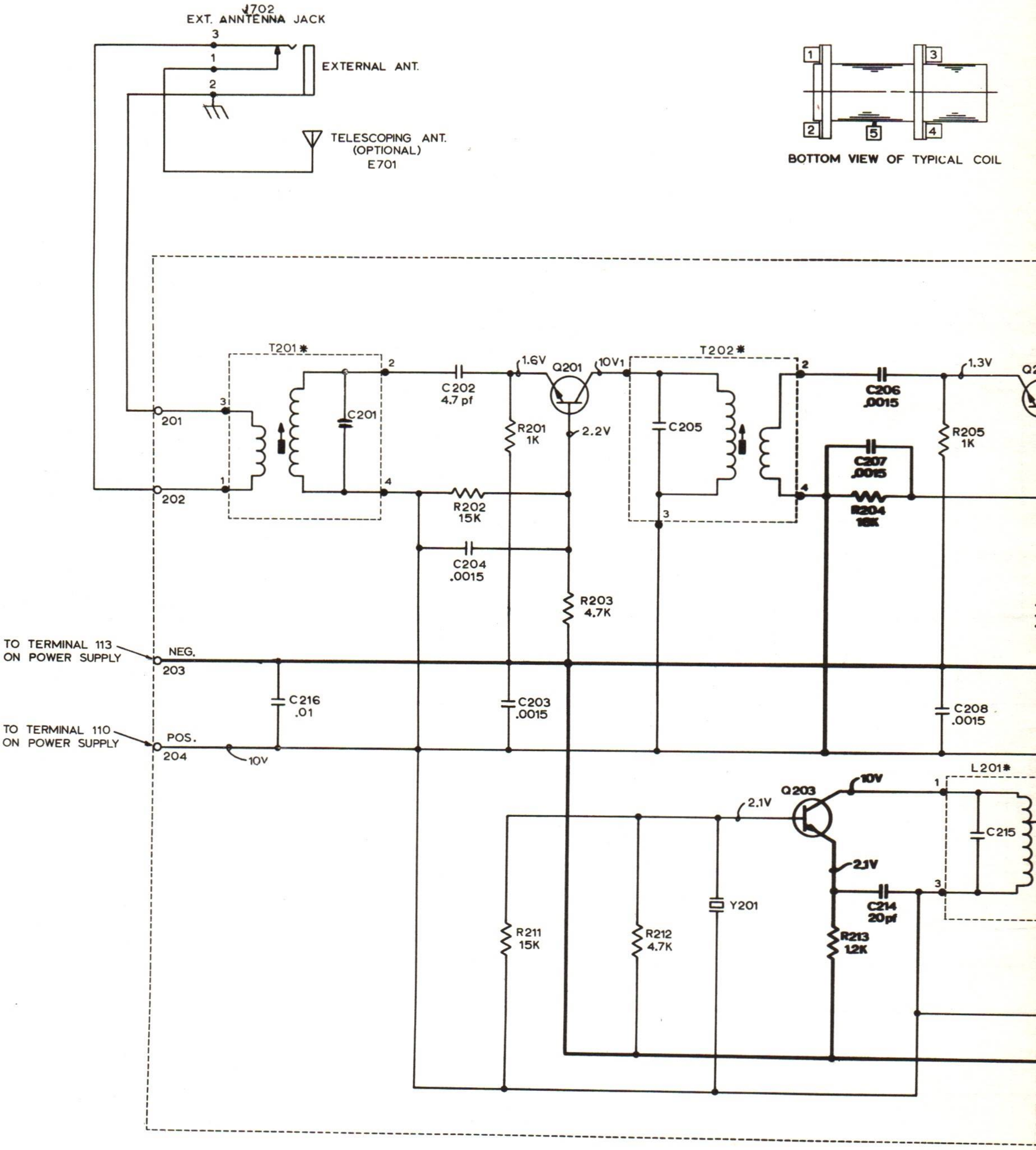
1. ALL RESISTOR VALUES IN OHMS AND 1/2 WATT UNLESS OTHERWISE STATED. K=1,000, M=1,000,000.
2. ALL CAPACITANCE VALUES IN MICROFARADS UNLESS OTHERWISE STATED.
3. ✱ COMPONENT VALUES DETERMINED BY INCOMING RADIO FREQUENCY, REFER TO PARTS LIST.
4. REFER TO TERMINAL LAYOUT FOR TERMINAL LOCATIONS. (FIG. 6)
5. ↗ INDICATES VOLTAGE READING LOCATIONS. ALL READINGS MADE WITH A VTVM WITH REFERENCE TO NEGATIVE.
6. ALL VOLTAGE READINGS TAKEN WITH NO SIGNAL APPLIED.
7. ✱✱ READING REFERENCED TO POSITIVE.

RF HI-BA
COMPONENT GR
#300

414-415-416 **FIG. 10 (Rev. 1) RF HI-BAND SCHEMATIC**


V
Q302
10V
C310
4.7 pf
1.8V
L303
*T302
1
3
C311
4
2
0.7V
0.7V
R306
4.7K
R307
4.7K
C312
.0015
C317
4.7 pf
R308
56K
Q304
9.9V
R314
2.7K
0.2V
T303
3
5
1
C318
50 pf
4
2
306
305
COAXIAL CABLE TO
TERMINALS 619 & 620
ON IF AUDIO
C319
.0015
R313
4.7K
*L305
4
3
4
CR301
C315
2
-0.5V
**
C316
.01
R312
1K

AND
OUP

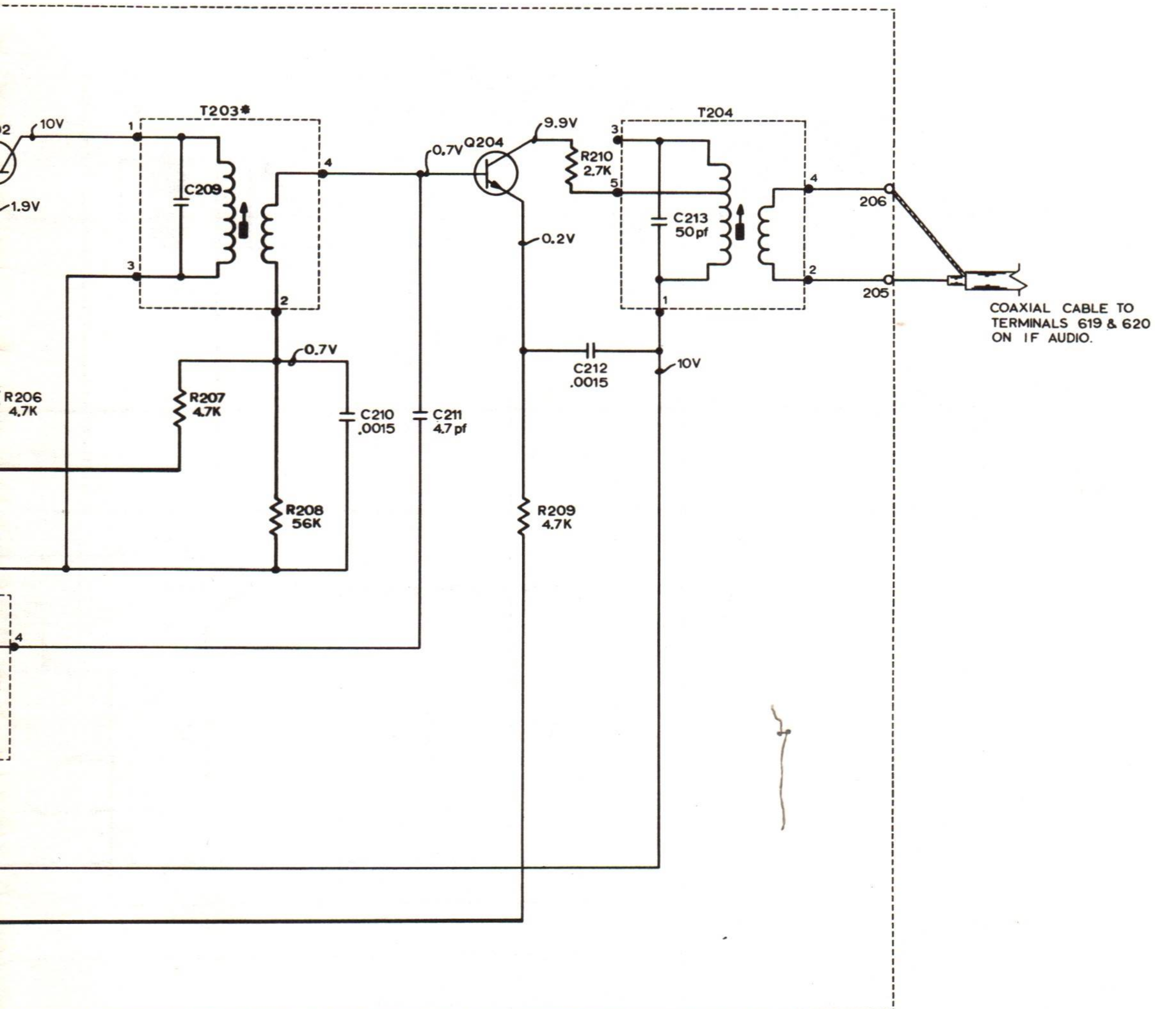


NOTES:

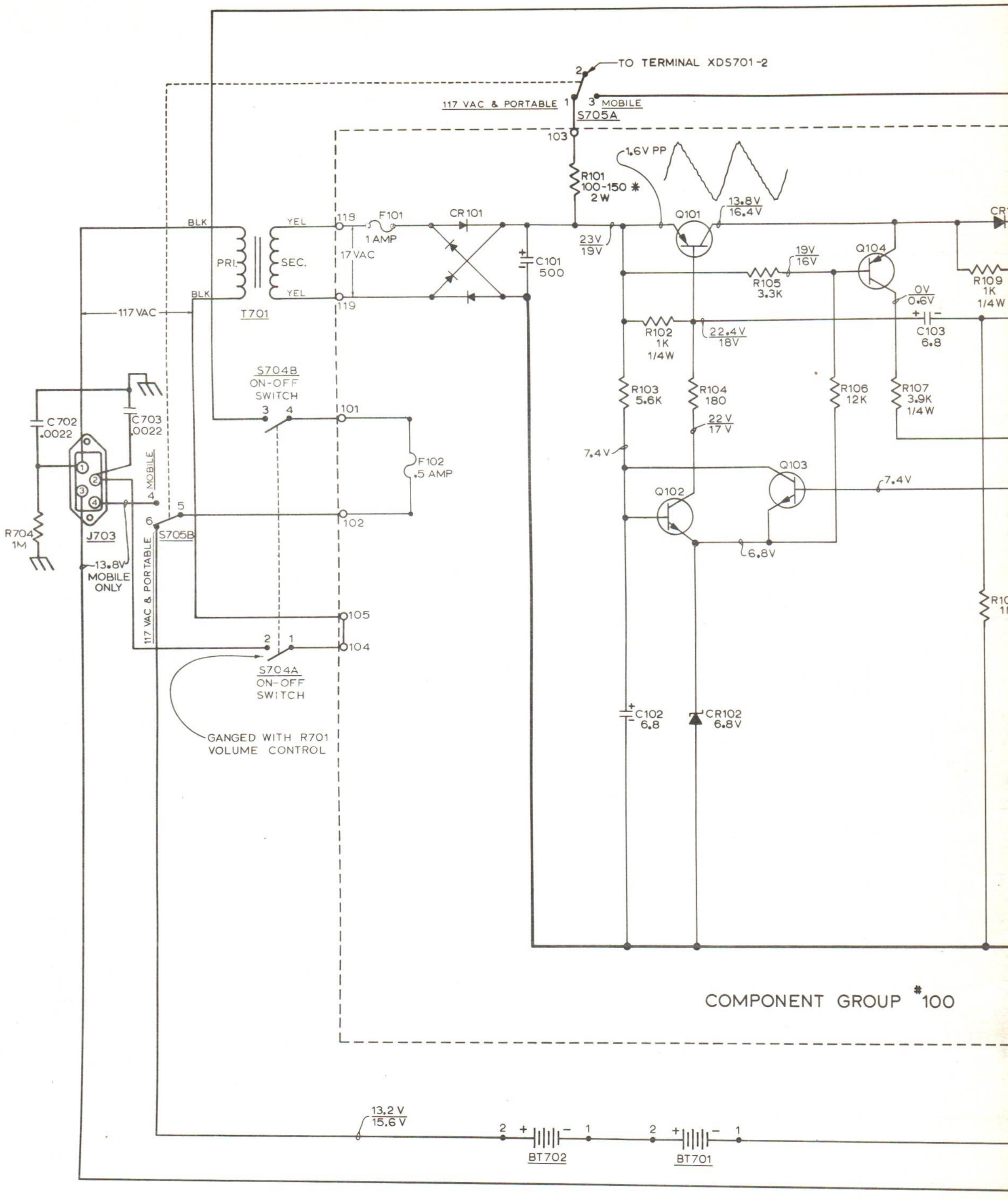
1. ALL RESISTOR VALUES IN OHMS AND 1/2 WATT UNLESS OTHERWISE STATED. K=1,000, M=1,000,000.
2. ALL CAPACITANCE VALUES IN MICROFARADS UNLESS OTHERWISE STATED.
3. ✱ COMPONENT VALUES DETERMINED BY INCOMING RADIO FREQUENCY, REFER TO PARTS LIST.
4. REFER TO TERMINAL LAYOUT FOR TERMINAL LOCATIONS. (FIG. 6)
5. ⌐ INDICATES VOLTAGE READING LOCATIONS. ALL READINGS MADE WITH A VTVM WITH REFERENCE TO NEGATIVE.
6. ALL VOLTAGE READINGS TAKEN WITH NO SIGNAL APPLIED.

RF LO-
COMONEN
*20

414-415-416 FIG. 9 (Rev. 1) RF LO-BAND SCHEMATIC



-BAND
T GROUP
0

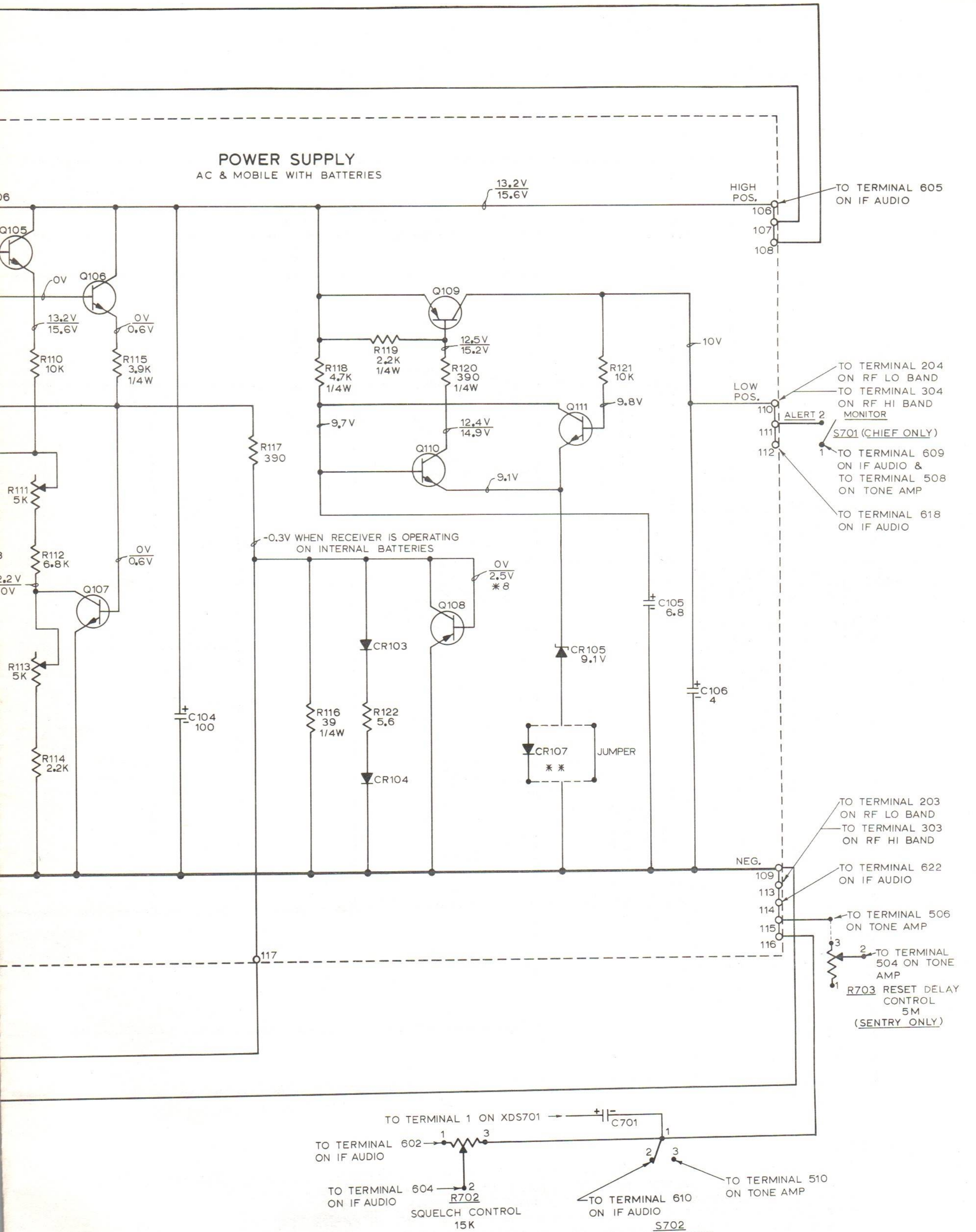


NOTES:

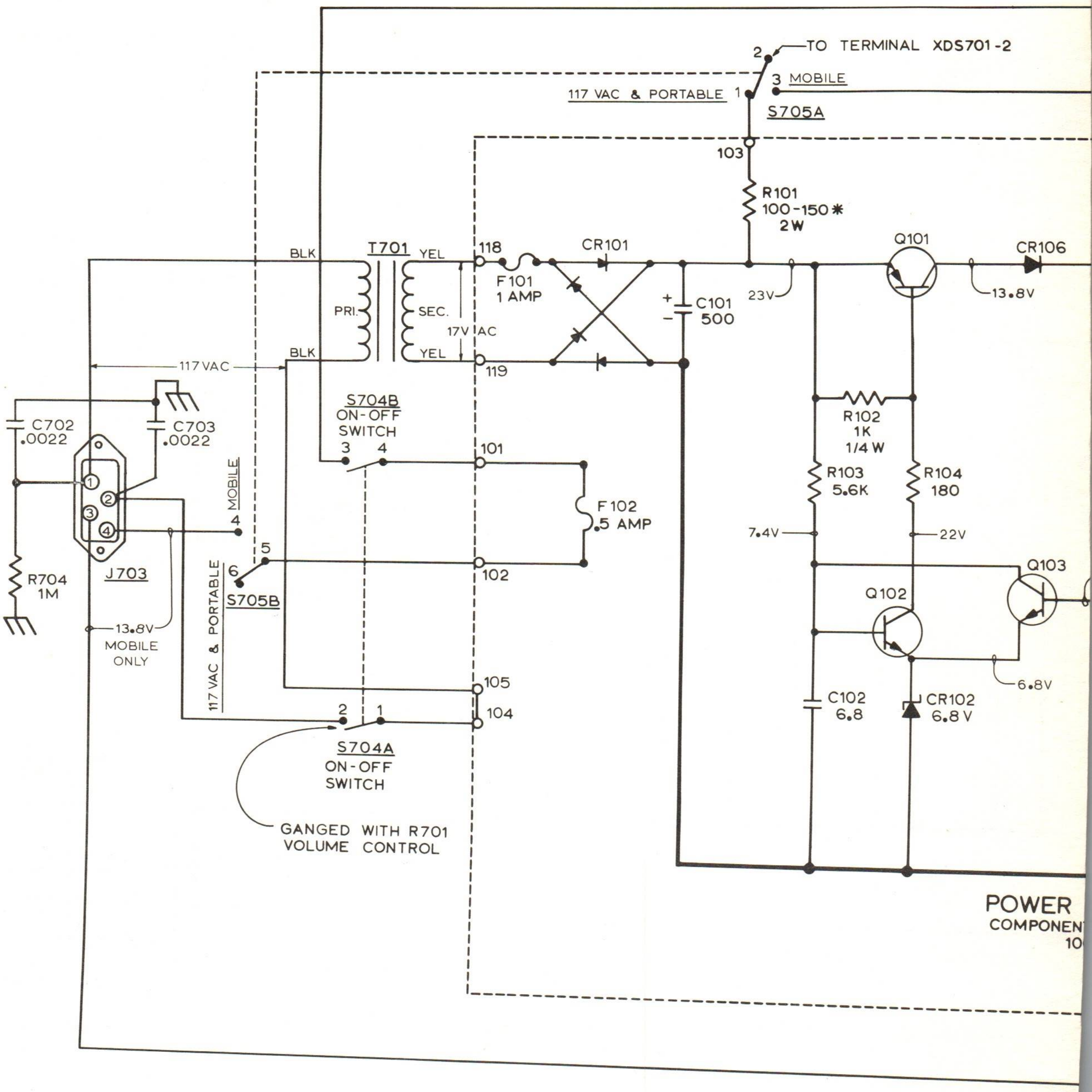
1. ALL RESISTOR VALUES IN OHMS AND 1/2 WATT UNLESS OTHERWISE STATED. K=1,000, M=1,000,000.
2. ALL CAPACITANCE VALUES IN MICROFARADS.
3. REFER TO TERMINAL LAYOUT FOR TERMINAL LOCATIONS. (FIG. 6)
4. ✱✱ VOLTAGE OF ZENER CR105 WILL DETERMINE IF CR107 OR THE JUMPER IS USED.
5. ✱ THE VALUE OF R101 MAY BE VARIED TO CHANGE THE INTENSITY OF THE PILOT LIGHT.
6. VOLTAGES ARE DC UNLESS OTHERWISE INDICATED AND MEASURED WITH AN 11 MEG VTVM.
7. ⟜ INDICATES VOLTAGE READING LOCATIONS MEASURED TO COMMON NEG. UNLESS OTHERWISE INDICATED, ABOVE LINE CHARGING CIRCUIT STANDBY, BELOW LINE CHARGING CIRCUIT ACTIVATED.

✱8. VOLTAGE WILL VARY, DEPENDING ON BATTERY CHARGE.

FIG. 12 (Rev. 1) POWER SUPPLY SCHEMATIC, MOBILE AND AC WIT


POWER SUPPLY
AC & MOBILE WITH BATTERIES
13.2V
15.6V
HIGH POS.
106
107
108
TO TERMINAL 605 ON IF AUDIO
06
Q105
Q106
0V
13.2V
15.6V
0V
0.6V
R110 10K
R115 3.9K 1/4W
Q109
R119 2.2K 1/4W
12.5V
15.2V
R118 4.7K 1/4W
R120 390 1/4W
R121 10K
10V
9.8V
Q111
9.7V
12.4V
14.9V
Q110
9.1V
LOW POS.
110
111
112
ALERT 2
MONITOR
S701 (CHIEF ONLY)
1
TO TERMINAL 204 ON RF LO BAND
TO TERMINAL 304 ON RF HI BAND
TO TERMINAL 609 ON IF AUDIO &
TO TERMINAL 508 ON TONE AMP
TO TERMINAL 618 ON IF AUDIO
R117 390
R111 5K
R112 6.8K
2.2V
0V
0V
0.6V
Q107
R113 5K
R114 2.2K
-0.3V WHEN RECEIVER IS OPERATING ON INTERNAL BATTERIES
0V
2.5V
*8
Q108
CR103
R116 39 1/4W
R122 5.6
CR104
C104 100
CR105 9.1V
CR107
* *
JUMPER
C105 6.8
C106 4
NEG.
109
113
114
115
116
117
TO TERMINAL 203 ON RF LO BAND
TO TERMINAL 303 ON RF HI BAND
TO TERMINAL 622 ON IF AUDIO
TO TERMINAL 506 ON TONE AMP
3
2
1
TO TERMINAL 504 ON TONE AMP
R703 RESET DELAY CONTROL 5M
(SENTRY ONLY)
TO TERMINAL 1 ON XDS701
C701
TO TERMINAL 602 ON IF AUDIO
1
3
2
TO TERMINAL 604 ON IF AUDIO
R702
SQUELCH CONTROL 15K
1
2
3
TO TERMINAL 610 ON IF AUDIO
TO TERMINAL 510 ON TONE AMP
S702
RESET SWITCH

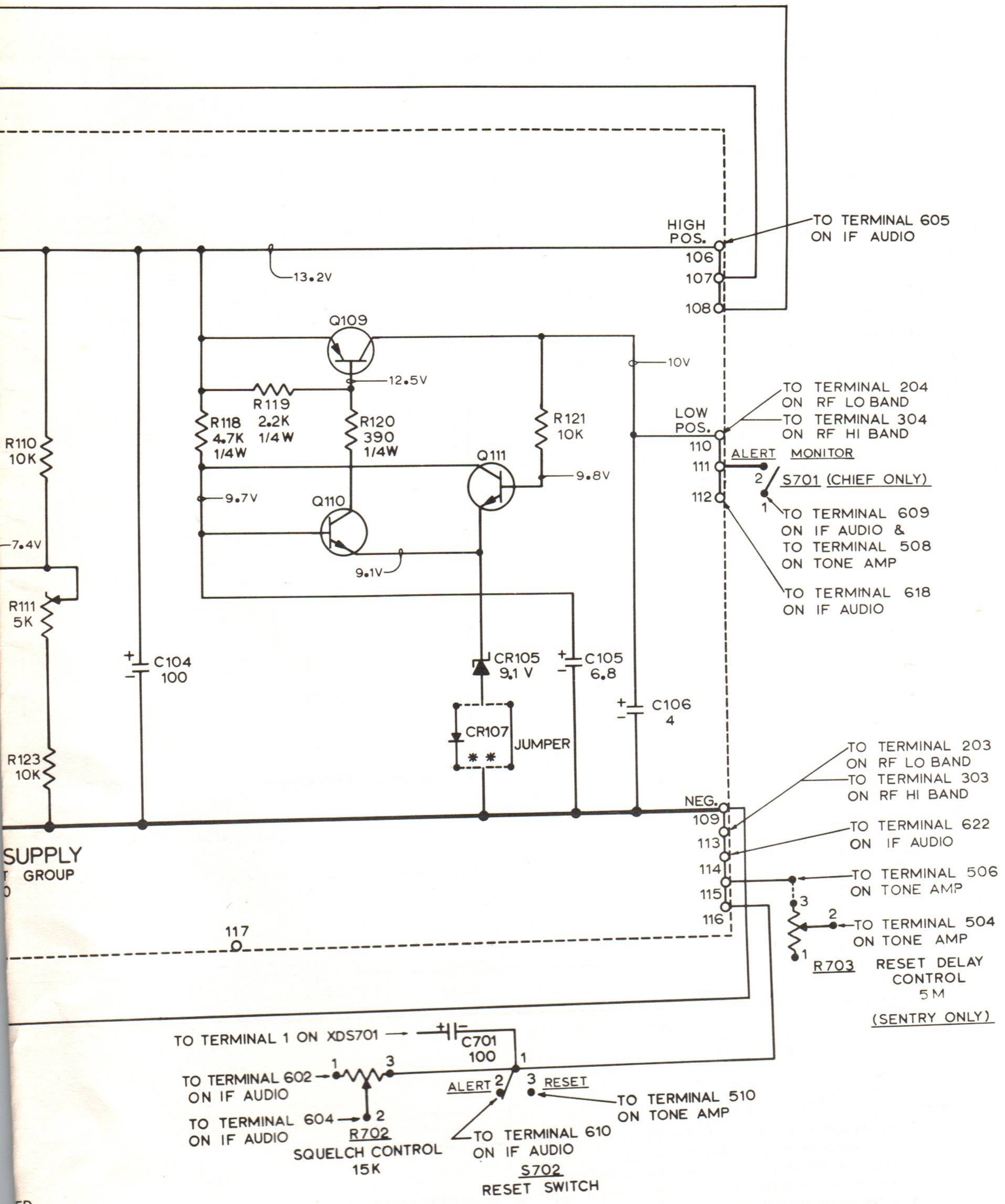
H BATTERIES



NOTES:

1. ALL RESISTOR VALUES IN OHMS AND 1/2 WATT UNLESS OTHERWISE STATED. K=1,000, M=1,000,000.
2. ALL CAPACITANCE VALUES IN MICROFARADS UNLESS OTHERWISE STATED.
3. REFER TO TERMINAL LAYOUT FOR TERMINAL LOCATIONS. (FIG. 6)
4. ✱ THE VALUE OF R101 MAY BE VARIED TO CHANGE THE INTENSITY OF THE PILOT LIGHT.
5. ✱✱ VOLTAGE OF ZENER CR105 WILL DETERMINE IF CR107 OR THE JUMPER IS USED.
6. ⤙ INDICATES VOLTAGE READING LOCATIONS MEASURED TO COMMON NEGATIVE UNLESS OTHERWISE INDICAT
7. VOLTAGES ARE DC UNLESS OTHERWISE INDICATED AND MEASURED WITH AN 11 MEG VTVM.

FIG. 11 (Rev. 1) POWER SUPPLY SCHEMATIC, MOBILE AND AC WITHO


HIGH POS.
TO TERMINAL 605 ON IF AUDIO
106
107
108
13.2V
Q109
12.5V
10V
R119 2.2K 1/4W
R118 4.7K 1/4W
R120 390 1/4W
R121 10K
R110 10K
LOW POS.
TO TERMINAL 204 ON RF LO BAND
TO TERMINAL 304 ON RF HI BAND
110
111
112
ALERT
MONITOR
S701 (CHIEF ONLY)
2
1
TO TERMINAL 609 ON IF AUDIO &
TO TERMINAL 508 ON TONE AMP
TO TERMINAL 618 ON IF AUDIO
Q111
9.8V
Q110
9.7V
7.4V
9.1V
R111 5K
C104 100
CR105 9.1 V
C105 6.8
C106 4
CR107
JUMPER
* *
R123 10K
NEG.
TO TERMINAL 203 ON RF LO BAND
TO TERMINAL 303 ON RF HI BAND
109
113
TO TERMINAL 622 ON IF AUDIO
114
115
116
TO TERMINAL 506 ON TONE AMP
3
2
TO TERMINAL 504 ON TONE AMP
1
R703 RESET DELAY CONTROL 5M
(SENTRY ONLY)
SUPPLY
T GROUP
0
117
TO TERMINAL 1 ON XDS701
C701 100
1
TO TERMINAL 602 ON IF AUDIO
1
3
TO TERMINAL 604 ON IF AUDIO
2
R702 SQUELCH CONTROL 15K
ALERT 2
3 RESET
TO TERMINAL 510 ON TONE AMP
TO TERMINAL 610 ON IF AUDIO
S702 RESET SWITCH

ED.

UT BATTERIES

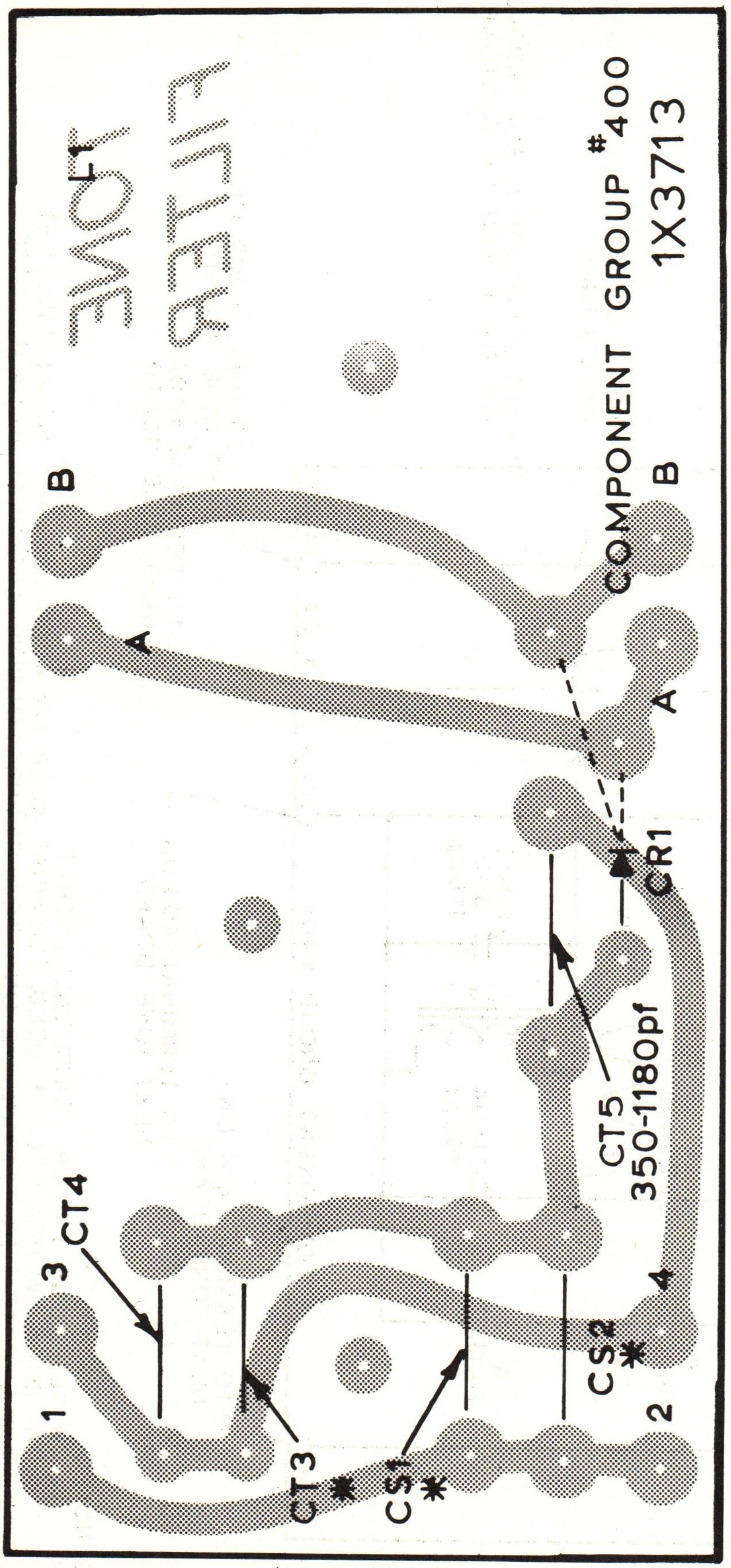
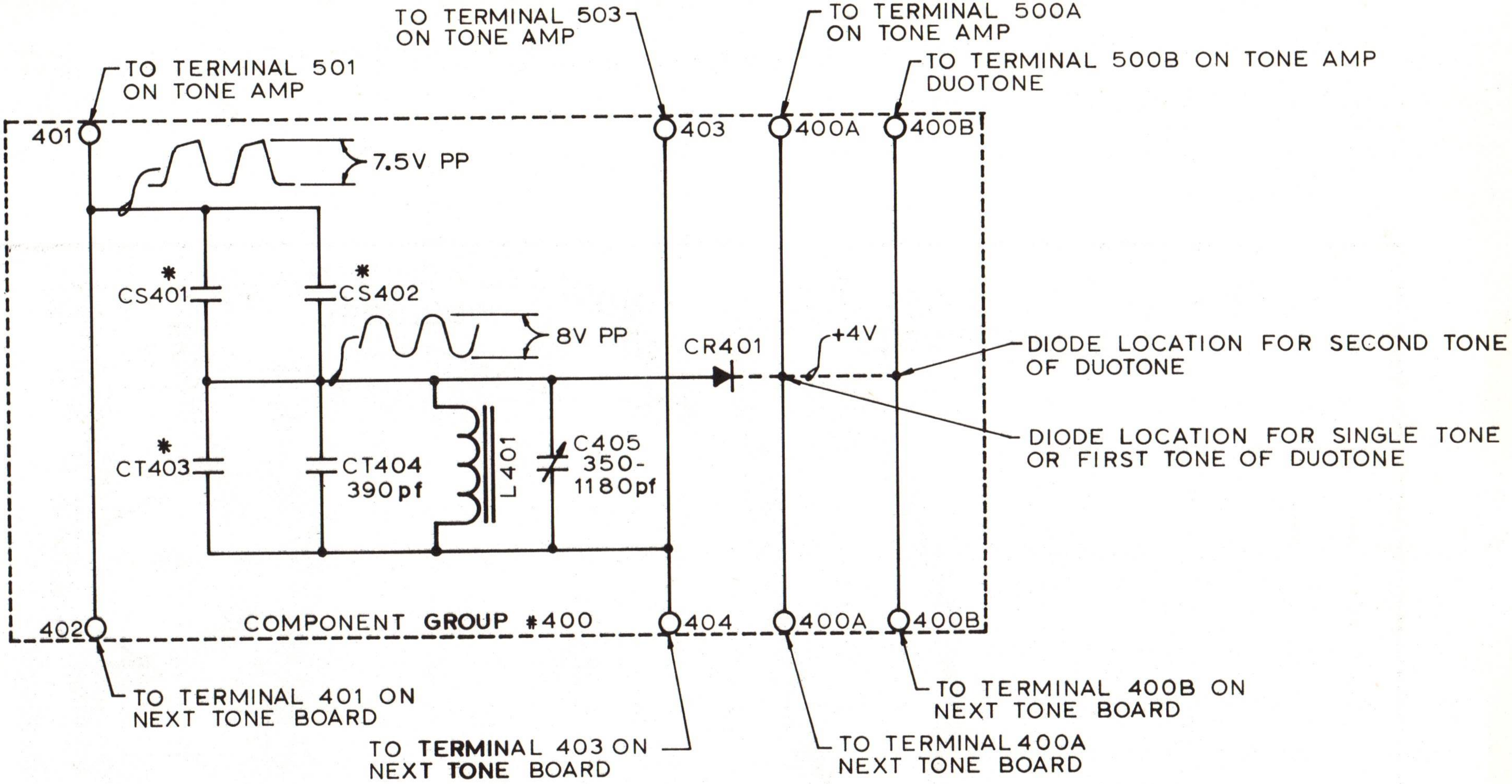


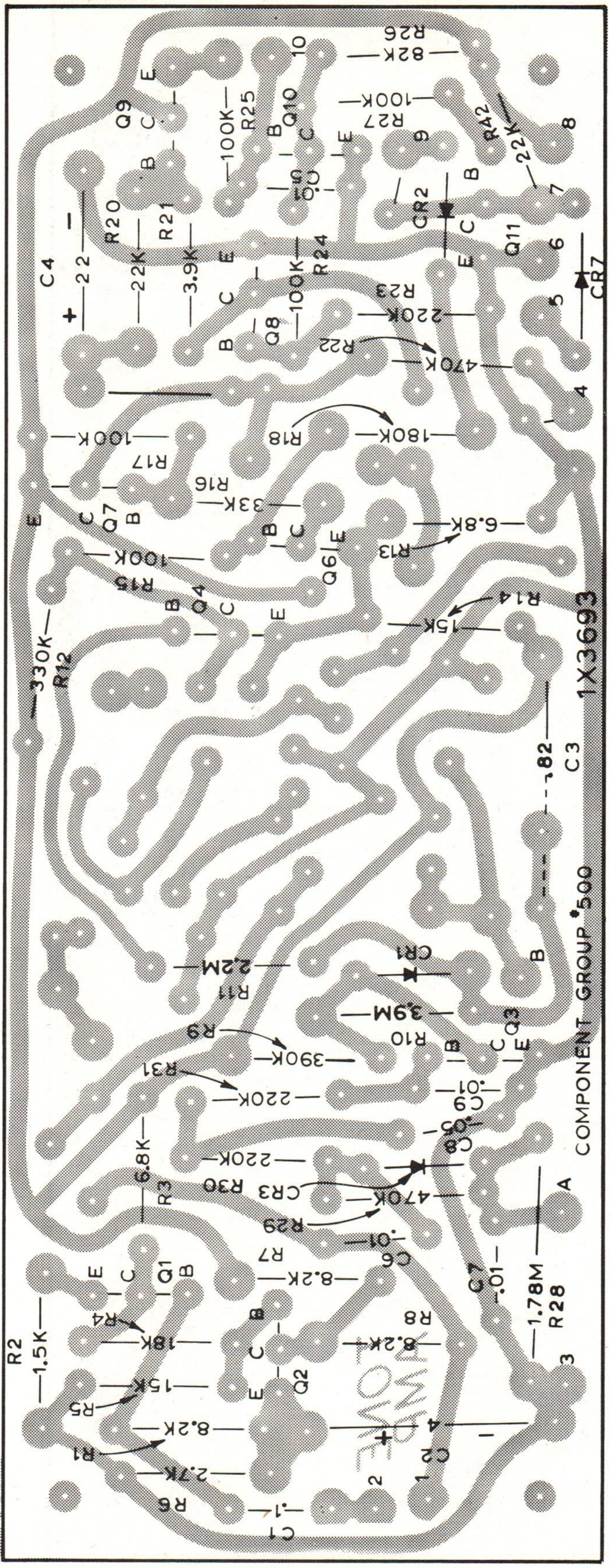
FIG. 13 (Rev. 1) TONE FILTER PRINTED CIRCUIT BOARD


TO TERMINAL 501 ON TONE AMP
TO TERMINAL 503 ON TONE AMP
TO TERMINAL 500A ON TONE AMP
TO TERMINAL 500B ON TONE AMP DUOTONE
401
403
400A
400B
7.5V PP
* CS401
* CS402
8V PP
CR401
+4V
DIODE LOCATION FOR SECOND TONE OF DUOTONE
DIODE LOCATION FOR SINGLE TONE OR FIRST TONE OF DUOTONE
* CT403
CT404 390pf
L401
C405 350-1180pf
402
COMPONENT GROUP #400
404
400A
400B
TO TERMINAL 401 ON NEXT TONE BOARD
TO TERMINAL 403 ON NEXT TONE BOARD
TO TERMINAL 400A NEXT TONE BOARD
TO TERMINAL 400B ON NEXT TONE BOARD

NOTES:

1. ✱ SEE TONE FILTER **PARTS VAL**UE CHART.
2. IF DUTY SWITCH S703 **IS USED,** TERMINAL 400A OR 400B ON LAST BOARD MUST BE CONNECTED TO **TERMINAL 2 ON** S703. CORRESPONDING TERMINAL 400A OR 400B ON ADJACENT BOARD **MUST BE** CONNECTED TO TERMINAL 1 ON S703.
3. REFER TO TERMINAL **LAYOUT FOR** TERMINAL LOCATIONS.(FIG.6)
4. ⊸ INDICATES VOLTAGE **READING** LOCATIONS TO COMMON NEGATIVE.
5. ALL VOLTAGE READINGS **DC** UNLESS OTHERWISE STATED AND MADE WITH CORRECT TONE APPLIED **AT** THE ±2% BANDWIDTH LIMITS AND ARE MIN. TURN ON VOLTAGE.

FIG. 14 (Rev. 1) TONE FILTER SCHEMATIC



414-415 FIG. 15 (Rev. 1) TONE AMP SINGLE TONE PRINTED CIRCUIT BOARD

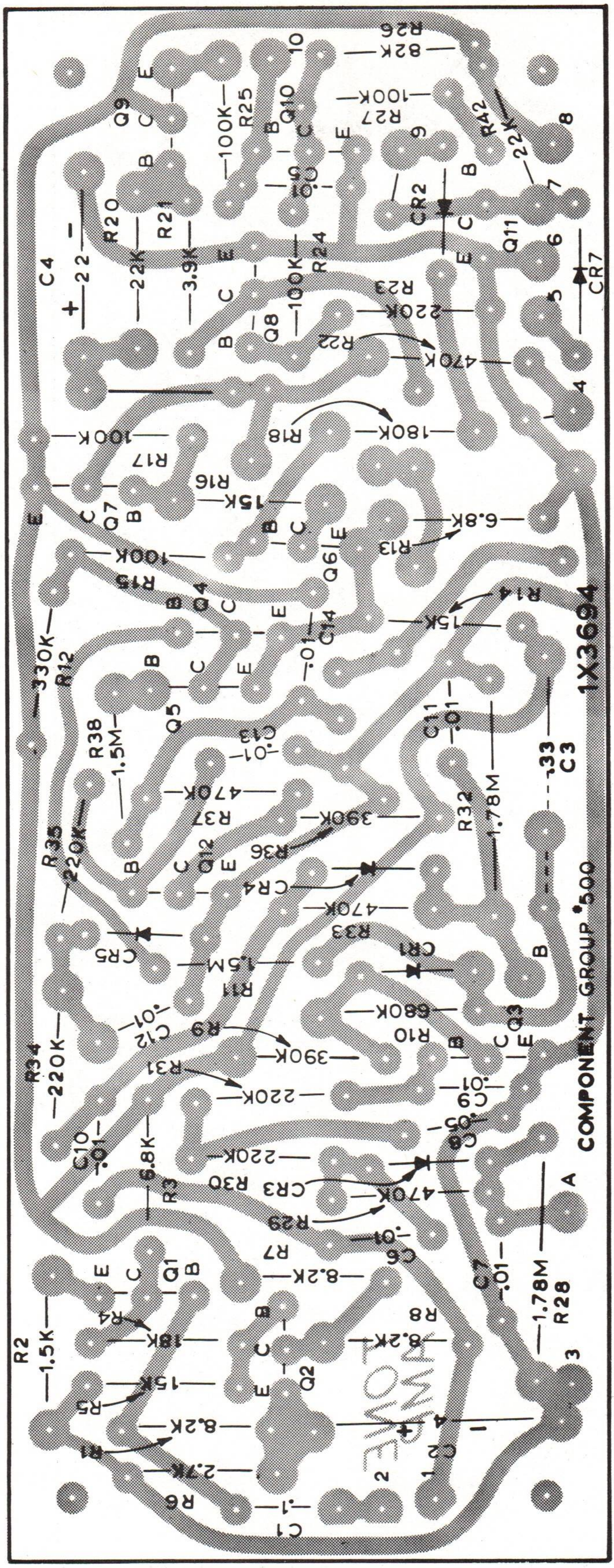
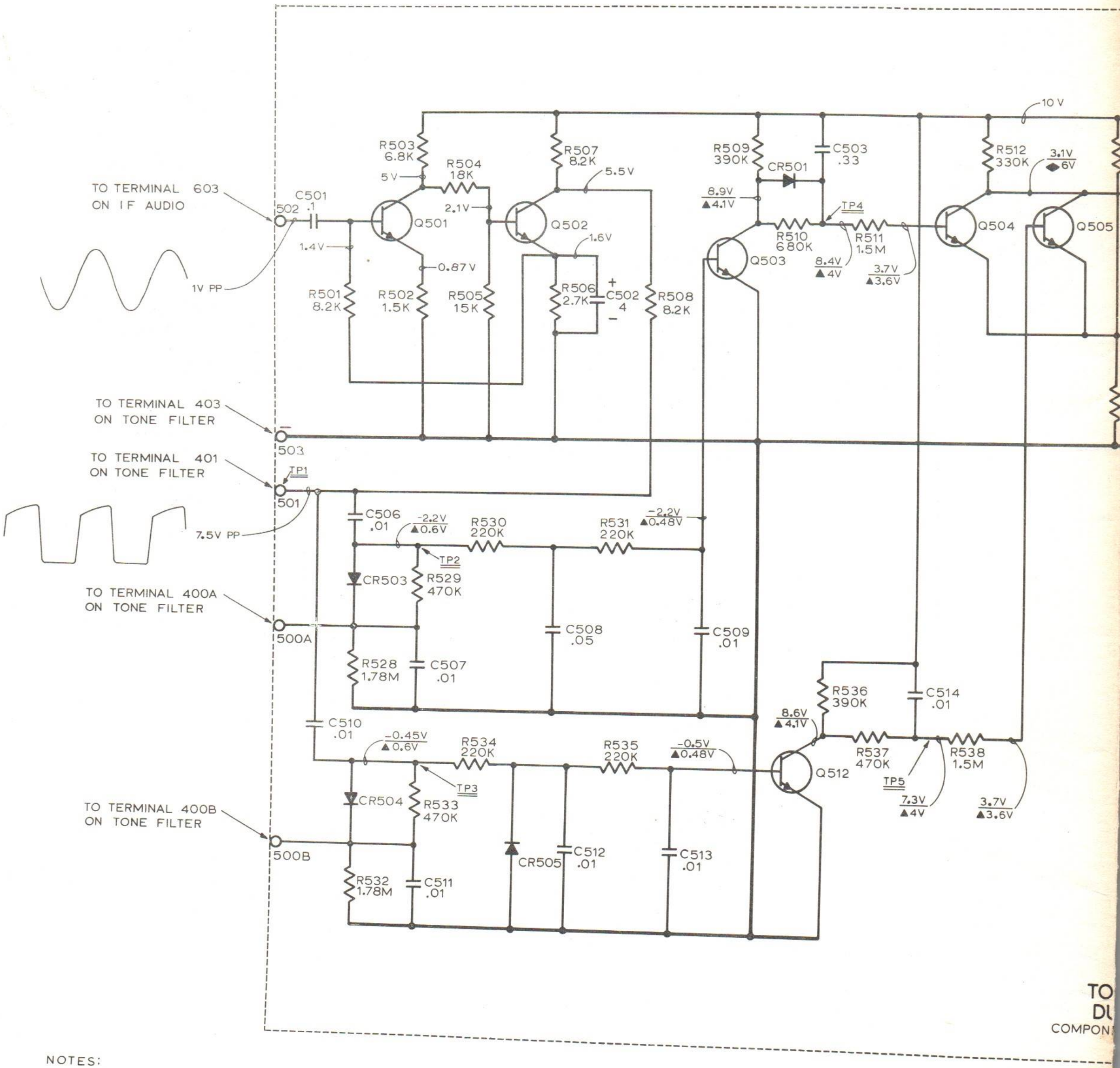


FIG. 16 (Rev. 1) TONE AMP DUOTONE PRINTED CIRCUIT BOARD



NOTES:

1. ALL RESISTORS IN OHMS AND 1/2 WATT UNLESS OTHERWISE STATED. K=1,000, M=1,000,000
2. ALL CAPACITANCE VALUES IN MICROFARADS UNLESS OTHERWISE STATED.
3. REFER TO TERMINAL LAYOUT FOR TERMINAL LOCATION. (FIG. 6)
4. ⊸INDICATES VOLTAGE READING LOCATIONS TO COMMON NEG.
5. TP INDICATE TEST POINT.
6. ALL VOLTAGES DC AND MADE WITH AN 11 MEGOHM VTVM.
7. VOLTAGE READINGS ABOVE LINE ARE WITH NO TONE AND NO RF SIGNAL APPLIED.

*8. THESE PARTS OMITTED IN CHIEF WITHOUT CARRIER RESET AND SENTRY WITH AUTOMATIC RESET ONLY.

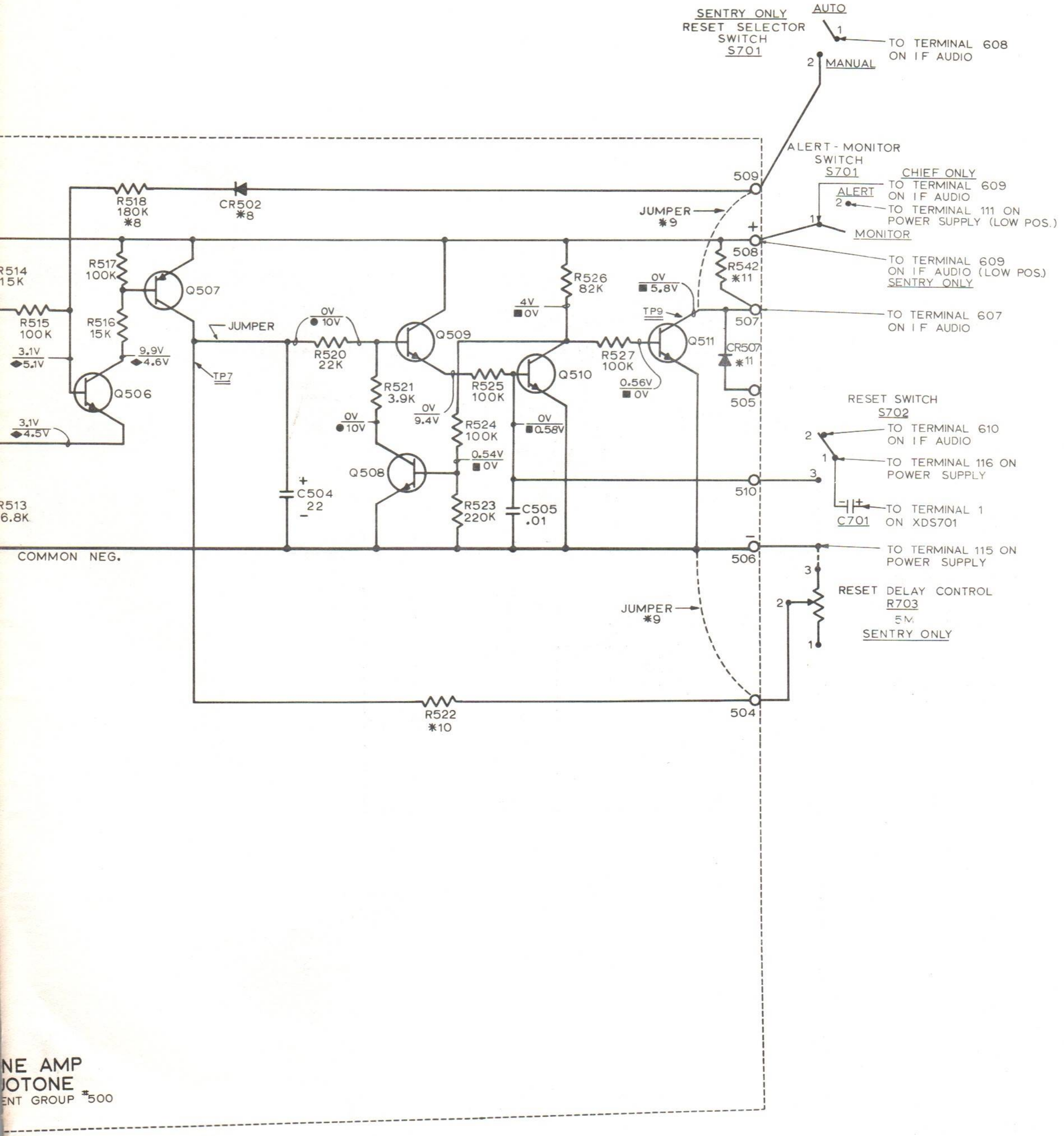
*9. THESE JUMPERS ARE IN CHIEF ONLY.

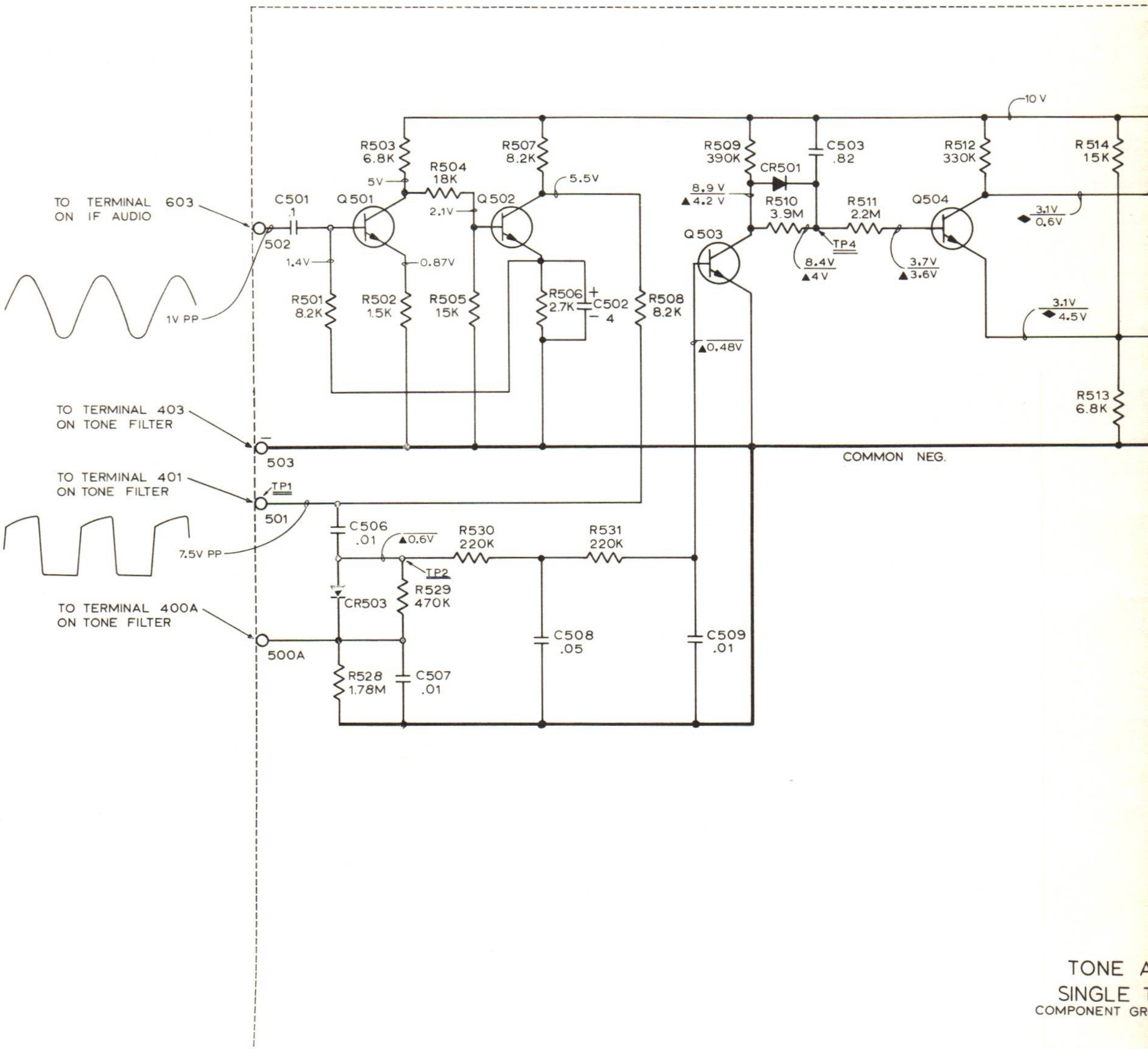
*10. STANDARD VALUE FOR THIS RESISTOR IS 470K BUT MAY BE INCREASED FOR LONGER RESET DELAY.

*11. THESE PARTS USED IN CHIEF MANUAL RESET ONLY.

12. ▲INDICATES ACTIVATION VOLTAGE READ WITH TONE FREQ. AT ±2% BANDWIDTH LIMITS.
13. ■INDICATES ACTIVATED VOLTAGE.
14. ● INDICATES MAXIMUM ACTIVATED VOLTAGES BUT WILL DROP AS C504 DISCHARGES, RECEIVER WILL RESET WHEN THESE VOLTAGES DROP TO 1.1 VOLTS. (EMITTER OF Q509 – APPROX. 0.7 VOLTS).
15. ◆READINGS WHEN FIRST TONE IS APPLIED AND TP5 SHORTED TO COMMON NEG. OR SECOND TONE APPLIED AND TP4 SHORTED TO COMMON NEG.

FIG. 18 (Rev. 1) TONE AMP DUOTONE SCHEMATIC

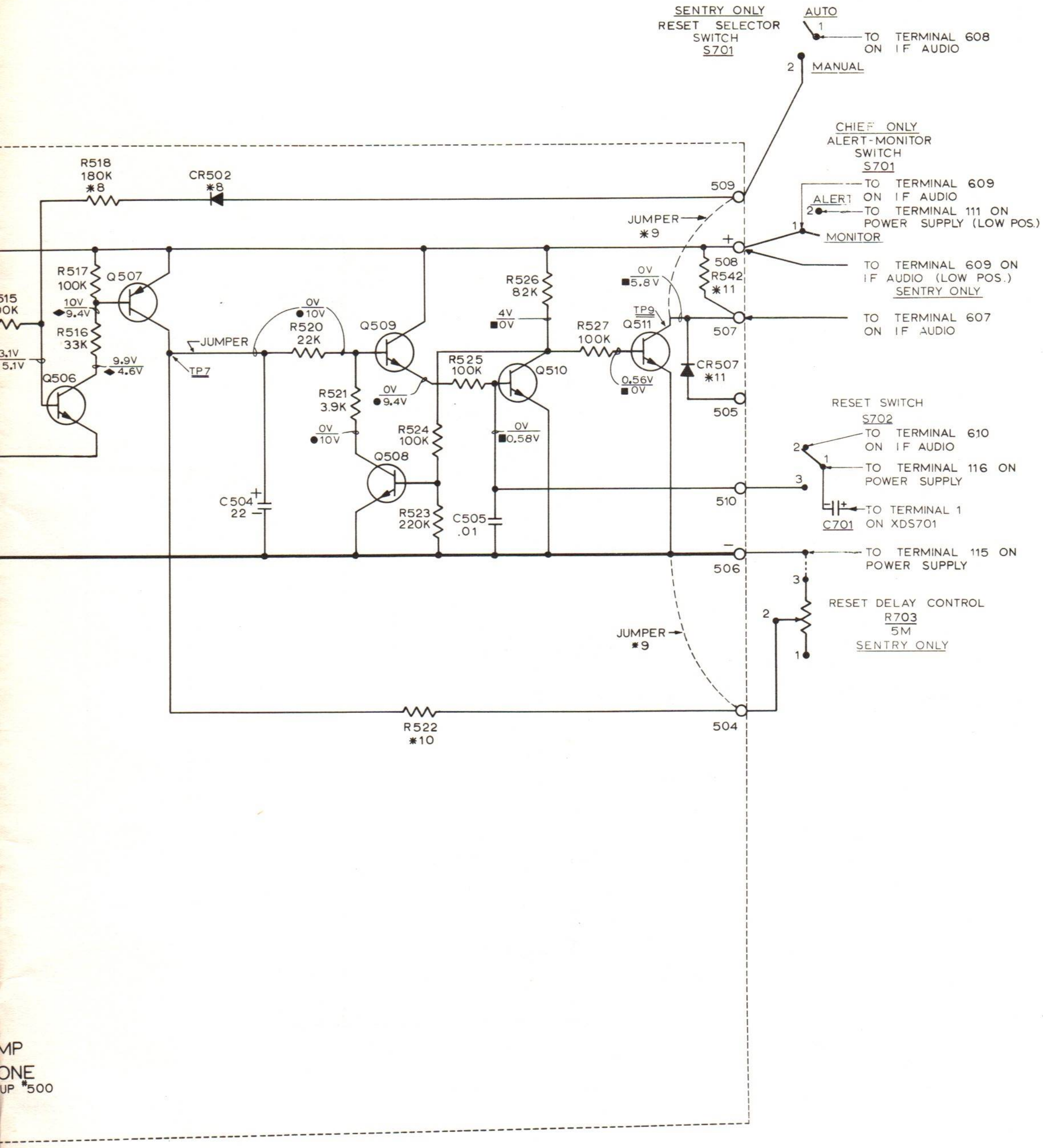

SENTRY ONLY
RESET SELECTOR
SWITCH
S701
AUTO
1
TO TERMINAL 608
ON I F AUDIO
2
MANUAL
ALERT - MONITOR
SWITCH
S701
CHIEF ONLY
TO TERMINAL 609
ON I F AUDIO
ALERT
2
TO TERMINAL 111 ON
POWER SUPPLY (LOW POS.)
1
MONITOR
TO TERMINAL 609
ON I F AUDIO (LOW POS.)
SENTRY ONLY
TO TERMINAL 607
ON I F AUDIO
R518
180K
*8
CR502
*8
509
JUMPER
*9
+
508
R542
*11
507
505
CR507
*11
R514
15K
R517
100K
Q507
R515
100K
R516
15K
3.1V
◆5.1V
9.9V
◆4.6V
JUMPER
TP7
Q506
3.1V
◆4.5V
0V
●10V
R520
22K
Q509
R521
3.9K
0V
9.4V
R525
100K
Q510
R526
82K
4V
■0V
0V
■5.8V
TP9
R527
100K
Q511
0.56V
■0V
0V
●10V
R524
100K
0V
■0.58V
0.54V
■0V
Q508
R513
6.8K
+
C504
22
−
R523
220K
C505
.01
510
RESET SWITCH
S702
2
TO TERMINAL 610
ON I F AUDIO
1
TO TERMINAL 116 ON
POWER SUPPLY
3
C701
TO TERMINAL 1
ON XDS701
COMMON NEG.
−
506
TO TERMINAL 115 ON
POWER SUPPLY
3
2
RESET DELAY CONTROL
R703
5M
SENTRY ONLY
1
JUMPER
*9
R522
*10
504
NE AMP
JOTONE
ENT GROUP *500



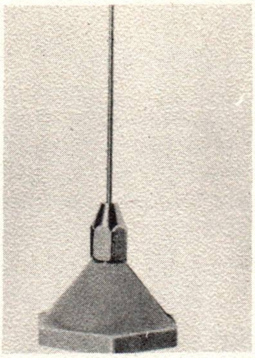
NOTES:

1. ALL RESISTORS IN OHMS AND 1/2 WATT UNLESS OTHERWISE STATED. K = 1,000, M = 1,000,000.
2. ALL CAPACITANCE VALUES IN MICROFARADS UNLESS OTHERWISE STATED.
3. REFER TO TERMINAL LAYOUT FOR TERMINAL LOCATIONS. (FIG. 6).
4. ⌐ INDICATES VOLTAGE READING LOCATIONS TO COMMON NEGATIVE.
5. TP INDICATES TEST POINT.
6. ALL VOLTAGES DC AND MADE WITH AN 11 MEGOHM VTVM.
7. VOLTAGE READINGS ABOVE LINE ARE WITH NO TONE AND NO RF SIGNAL APPLIED.
*8. THESE PARTS OMITTED IN CHIEF WITHOUT CARRIER RESET AND SENTRY WITH AUTOMATIC RESET ONLY.
*9. THESE JUMPERS ARE IN CHIEF ONLY.
*10. STANDARD VALUE FOR THIS RESISTOR IS 470K BUT MAY BE INCREASED FOR LONGER RESET DELAY.
*11. THESE PARTS USED IN CHIEF MANUAL RESET ONLY.
12. ▲ INDICATES ACTIVATION VOLTAGE READ WITH TONE FREQUENCY AT ±2% BANDWIDTH LIMITS.
13. ■ INDICATES ACTIVATED VOLTAGE.
14. ● INDICATES MAXIMUM ACTIVATED VOLTAGES BUT WILL DROP AS C504 DISCHARGES, RECEIVER WILL RESET WHEN THESE VOLTAGES DROP TO 1.1 VOLTS. (EMITTER OF Q509 – APPROX. 0.7 VOLTS).
15. ◆ READINGS WHEN CORRECT TONE IS APPLIED.

FIG. 17 (Rev. 1) TONE AMP SINGLE TONE SCHEMATIC


SENTRY ONLY
RESET SELECTOR SWITCH
S701
AUTO
1
TO TERMINAL 608 ON IF AUDIO
2
MANUAL
CHIEF ONLY
ALERT-MONITOR SWITCH
S701
TO TERMINAL 609 ON IF AUDIO
ALERT
2
TO TERMINAL 111 ON POWER SUPPLY (LOW POS.)
1
MONITOR
TO TERMINAL 609 ON IF AUDIO (LOW POS.)
SENTRY ONLY
TO TERMINAL 607 ON IF AUDIO
R518
180K
✱8
CR502
✱8
509
JUMPER
✱9
+
508
R542
✱11
507
R517
100K
Q507
515
0K
10V
◆9.4V
R516
33K
3.1V
5.1V
9.9V
◆4.6V
Q506
JUMPER
TP7
0V
●10V
R520
22K
Q509
R526
82K
4V
■0V
0V
■5.8V
R527
100K
TP9
Q511
R525
100K
Q510
0.56V
■0V
CR507
✱11
505
0V
●9.4V
R521
3.9K
0V
●10V
R524
100K
0V
■0.58V
Q508
RESET SWITCH
S702
2
TO TERMINAL 610 ON IF AUDIO
1
TO TERMINAL 116 ON POWER SUPPLY
3
510
C504
22
+
R523
220K
C505
.01
TO TERMINAL 1 ON XDS701
C701
−
506
TO TERMINAL 115 ON POWER SUPPLY
3
2
RESET DELAY CONTROL
R703
5M
SENTRY ONLY
1
JUMPER
✱9
R522
✱10
504
MP
ONE
UP #500

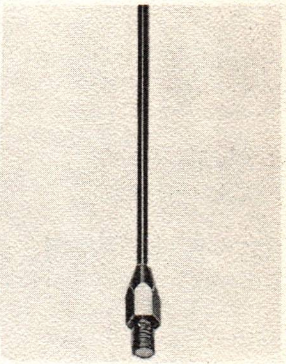
PLECTRON ACCESSORIES



MOBILE WHIP (High Band)

A commercial duty unity gain, quarter-wave length mobile whip which is complete with a molded styron, roof top base assembly and solderless connector for RG-58/AU coaxial cable.

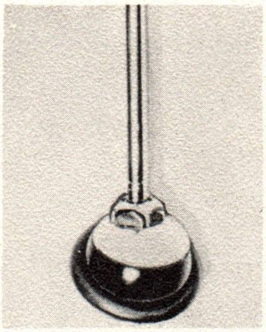
Part No. 1A2434 .... Price $4.95



MOBILE WHIP (Low Band)

A professional quality stainless steel full size whip. Quarter-wave length with an over-all height of 102 inches. Highest quality taper ground construction. Standard ⅜" by 24 threaded cadmium plated base stud. May be mounted with or without spring on either bumper or body mount.

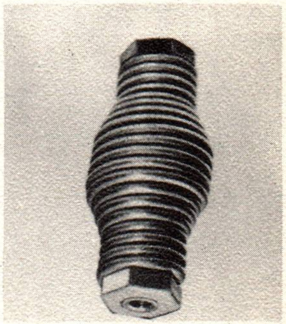
Part No. 1A2430 .... Price $6.95



BALL TYPE ANTENNA

Low-priced antenna suitable for either high or low band Mobile FM reception. Complete with 46" lead cable and IP766 for connecting to Plectron's Mobile receivers. Low band includes 57" collapsing element; High band 20" fixed length element.

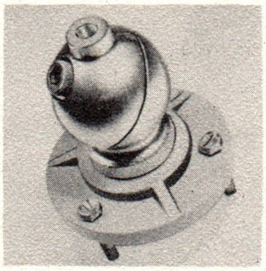
Low Band Part No. 1A2441
High Band Part No. 1A2440 .... Price $5.95



STANDARD SPRING

Cadmium plated, double tapered steel spring. Spring ends ground flat for perfect alignment. Excellent electrical connection maintained by internal shorting braid. Accepts standard ⅜" by 24 stud; will fit either body or bumper mount.

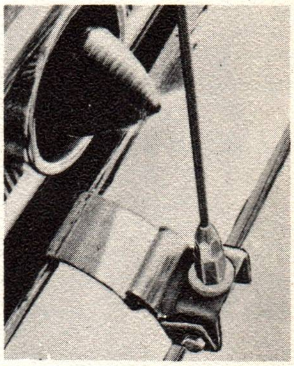
Part No. 1X2433 .... Price $3.95



BODY MOUNT

Standard cadmium-plated automotive body mount. Steel swivel head much superior to split ball type. Molded cycolac base furnished with rubber body washer. Easily mounted from top side of any single or double wall body panel.

Part No. 1X2432 .... Price $4.95



BUMPER MOUNT

Universal heavy duty stainless steel bumper mount. Quickly and easily attached to most automobile bumpers. Bumper mount includes stainless steel mounting strap and is fully adjustable for vertical alignment.

Part No. 1X2431 .... Price $10.95

COAXIAL CABLE KIT

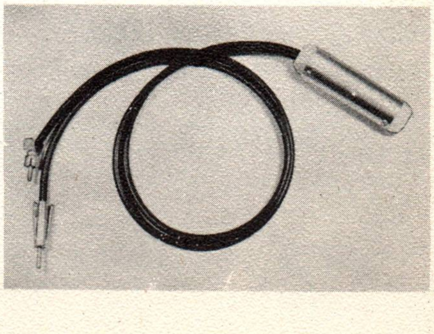
Sixteen feet of RG-58/AU coaxial cable with 1P766 attached. For use with mobile antennas, 1A2434 & 1A2430.

Part No. 1W2442... Price $1.95

ANTENNA ADAPTER ASSEMBLY

A unique antenna coupler which adapts your present AM radio antenna for AM/FM reception. Includes 2-foot lead cable and automotive type plug for connecting your AM radio, also 2-foot lead and 1P766 for connecting your Plectron Mobile Receiver.

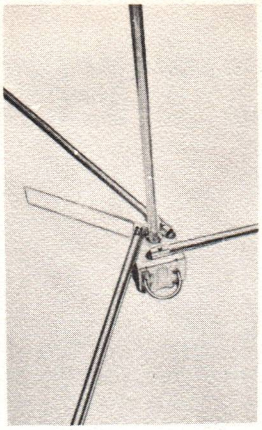
Part No. 1X2341 .... Price $4.95



GROUND PLANE ANTENNA (Low Band)

Delivers maximum efficiency at a very reasonable cost. Radiator and radials are constructed of heavy wall ⅝″ and 7/16″ O.D. aluminum tubing. Unbreakable cycolac plastic and iridite treated steel base assembly accepts all masts up to 1⅝″ O.D. Complete with 50′ RG-58/AU cable and fittings.

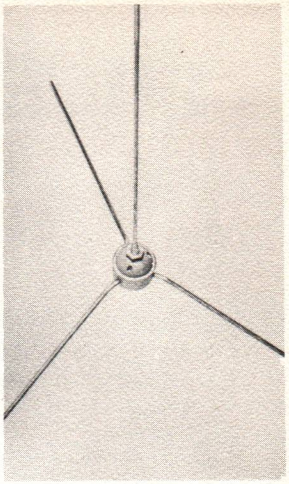
Part No. 1A2426 .... Price $29.95



GROUND PLANE ANTENNA (High Band)

A unity gain ground plane using drooping radials for impedance matching and to minimize low angle radiation. It is built to commercial duty standards and rated at 100 MPH at ½″ of radial ice. This antenna is extremely light-weight and constructed of aluminum which has been iridite-treated according to military specifications. Antenna is complete with 50′ of RG-58/AU cable and fittings.

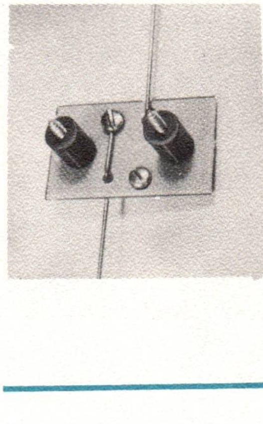
Part No. 1A2428 .... Price $15.95



HALF-WAVE DIPOLE ANTENNA (High Band)

A dipole type outdoor antenna which is quickly and easily mounted on the side of a house or other support. Provides excellent reception up to 30 miles from the transmitter under normal conditions. Complete with 30′ RG-58/AU cable and fittings.

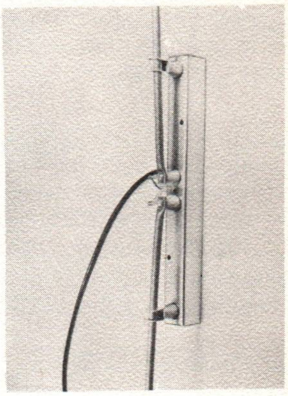
Part No. 1A1098 .... Price $4.95



HALF-WAVE DIPOLE ANTENNA (Low Band)

A highly efficient vertical ½ wave length dipole antenna. Antenna elements are cut to length to properly match each operating frequency. Each antenna assembly includes 50′ of RG-58/AU coaxial cable and fittings with instructions for assembly and installation.

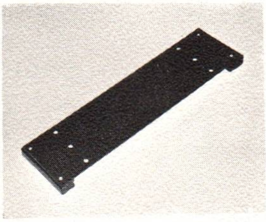
Part No. 1A1372 .... Price $14.95



MOBILE MOUNTING BRACKET

Sturdy, accessible, spring loaded mounting bracket enables receiver to snap into place in seconds. No loose parts—eliminates rattles and slipping. Bracket fits all Plectron Transistor Receivers.

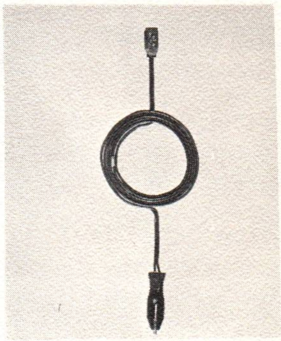
Part No. 1X3300 . . . . Price $4.00



DC POWER CABLE

Detachable 6 foot line cord with socket completely adapts your transistor receiver for DC use. DC cable is available with cigarette lighter adapter plug (illustrated).

Part No. 1W3014 . . . . Price $2.00
Part No. 1W3070 (W/Adapter) . . . . Price $4.00



REMOTE SPEAKER

The Plectron Remote Speaker is a 4″ speaker in an attractive black case with silver grill. A two-prong socket is provided on the back of each Plectron receiver for connecting the remote speaker. The speaker may be used at any distance up to 300 feet. Multiple speakers may be used at shorter distances.

Part No. 1X800 . . . . Price $5.95

REMOTE SPEAKER PLUG

Plug for connecting remote speaker to receiver.

Part No. 1P963 (for tubetype receiver) . . . . Price 20c ea.
Part No. 1P766 (for transistor receiver) . . . . Price 20c ea.

REMOTE SPEAKER CABLE

Cable assemblies complete with fittings are available in 50′, 100′, & 150′ lengths.

	Price 50′ $2.25
Part No. 1W1099 (for tube type receiver)	**Price 100′ $3.75**
Part No. 1W3548 (for transistor receiver)	**Price 150′ $5.25**

Prices include shipping charges and are subject to change without notice. Materials and workmanship guaranteed for 90 days.

SOLD BY:

Designed and Manufactured by
PLECTRON CORPORATION
Overton, Nebraska

PRINTED IN U.S.A

WARRANTY

PLECTRON CORPORATION warrants each new electronic product manufactured by them to be free from defective material and workmanship and agrees to remedy any such defect or to furnish a new part in exchange for any part of any unit of its manufacture which, under normal installation, use, and service, discloses such defect, provided the unit is delivered by the owner to the factory, intact, for examination, within one (1) year (except batteries which are guaranteed for 6 months) from the date the equipment was shipped to original purchaser; and provided such equipment discloses, in our judgment, that it is thus defective.

All parts returned under the terms of this warranty will be replaced without charge to the owner if examination discloses parts to be defective.

All units returned to the factory within one (1) year from the date stamped on the nameplate or date received and accepted for service under the terms of this warranty, will be repaired without charge to the owner and, in addition, for the first 90 days, all shipping charges will be paid (or refunded if prepaid) provided the equipment is returned by the carriers designated below. After the first 90 days and for the remainder of the one (1) year warranty period, ALL TRANSISTOR EQUIPMENT returned to the factory PREPAID under the terms of this warranty, will be repaired and RETURNED PREPAID.

WEIGHT	METHOD OF SHIPMENT
Under 25 lbs.	Parcel Post
25-50 lbs.	Greyhound Bus Express or REA Express
Over 50 lbs.	Motor Express (truck)

This warranty does not extend to any of our products which have been subjected to misuse, neglect, accident, incorrect wiring not our own, improper installation, or used in violation of instructions furnished by us or extend to units which have been repaired or altered outside of our factory, nor to cases where the serial number thereof has been removed, defaced, or changed, nor to accessories used therewith not of our manufacture.

This warranty is in lieu of all other warranties expressed or implied and no representative or person is authorized to assume for us any other liability in connection with the sale of our electronic products.

PLECTRON CORPORATION
Overton, Nebraska 68863

Form #399-11-65